JVC

Dear Customer,
Thank you for purchasing this digital video camera. Before use, please read the safety information and precautions contained in the pages 2 – 3 to ensure safe use of this product.

ENGLISH

DIGITAL VIDEO CAMERA

GR-D43

Please visit our Homepage on the World Wide Web for Digital Video Camera:

http://www.jvc.co.jp/english/cyber/

For Accessories:

http://www.jvc.co.jp/english/accessory/

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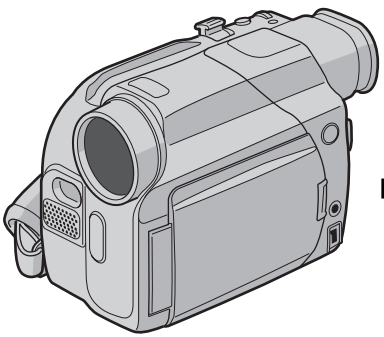


Mini DV PAL

To deactivate the demonstration, set "DEMO MODE" to "OFF". (☞ pg. 14, 16)

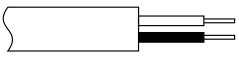
INSTRUCTIONS

LYT1239-001A

EN

SAFETY PRECAUTIONS

IMPORTANT (for owners in the U.K.)
Connection to the mains supply in the United Kingdom.
DO NOT cut off the mains plug from this equipment.
If the plug fitted is not suitable for the power points in your home or the cable is too short to reach a power point, then obtain an appropriate safety approved extension lead or consult your dealer.
BE SURE to replace the fuse only with an identical approved type, as originally fitted, and to replace the fuse cover.
If nonetheless the mains plug is cut off be sure to remove the fuse and dispose of the plug immediately, to avoid possible shock hazard by inadvertent connection to the mains supply.
If this product is not supplied fitted with a mains plug then follow the instructions given below:
DO NOT make any connection to the Larger Terminal coded E or Green.
The wires in the mains lead are coloured in accordance with the following code:



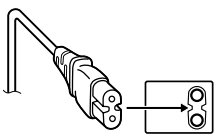
Blue to N (Neutral) or Black
Brown to L (Live) or Red

If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt — consult a competent electrician.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTIONS:
- To prevent shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified personnel.
- When you are not using the AC Adapter for a long period of time, it is recommended that you disconnect the power cord from AC outlet.

CAUTION:
To avoid electric shock or damage to the unit, first firmly insert the small end of the power cord into the AC Adapter until it is no longer wobbly, and then plug the larger end of the power cord into an AC outlet.



CAUTIONS:
- This camcorder is designed to be used with PAL-type colour television signals. It cannot be used for playback with a television of a different standard. However, live recording and LCD monitor/viewfinder playback are possible anywhere.
- Use the JVC BN-V408U/V416U/V428U battery packs and, to recharge them or supply power to the camcorder from an AC outlet, use the provided multi-voltage AC Adapter. (An appropriate conversion adapter may be necessary to accommodate different designs of AC outlets in different countries.)

NOTES:
- The rating plate (serial number plate) and safety caution are on the bottom and/or the back of the main unit.
- The rating information and safty caution of the AC Adapter are on its upper and lower sides.

When the equipment is installed in a cabinet or on a shelf, make sure that it has sufficient space on all sides to allow for ventilation (10 cm or more on both sides, on top and at the rear).

Do not block the ventilation holes.
(If the ventilation holes are blocked by a newspaper, or cloth etc. the heat may not be able to get out.)

No naked flame sources, such as lighted candles, should be placed on the apparatus.

When discarding batteries, environmental problems must be considered and the local rules or laws governing the disposal of these batteries must be followed strictly.

The apparatus shall not be exposed to dripping or splashing.

Do not use this equipment in a bathroom or places with water.
Also do not place any containers filled with water or liquids (such as cosmetics or medicines, flower vases, potted plants, cups etc.) on top of this unit.
(If water or liquid is allowed to enter this equipment, fire or electric shock may be caused.)

Do not point the lens or the viewfinder directly into the sun. This can cause eye injuries, as well as lead to the malfunctioning of internal circuitry. There is also a risk of fire or electric shock.

CAUTION!

The following notes concern possible physical damage to the camcorder and to the user.

When carrying, be sure to always securely attach and use the provided strap. Carrying or holding the camcorder by the viewfinder and/or the LCD monitor can result in dropping the unit, or in a malfunction.

Take care not to get your finger caught in the cassette holder cover. Do not let children operate the camcorder, as they are particularly susceptible to this type of injury.

Do not use a tripod on unsteady or unlevel surfaces. It could tip over, causing serious damage to the camcorder.

CAUTION!

Connecting cables (Audio/Video, S-Video, etc.) to the camcorder and leaving it on top of the TV is not recommended, as tripping on the cables will cause the camcorder to fall, resulting in damage.

SOME DO'S AND DON'TS ON THE SAFE USE OF EQUIPMENT

This equipment has been designed and manufactured to meet international safety standards but, like any electrical equipment, care must be taken if you are to obtain the best results and safety is to be assured.

DO read the operating instructions before you attempt to use the equipment.

DO ensure that all electrical connections (including the mains plug, extension leads and interconnections between pieces of equipment) are properly made and in accordance with the manufacturer's instructions. Switch off and withdraw the mains plug when making or changing connections.

DO consult your dealer if you are ever in doubt about the installation, operation or safety of your equipment.

DO be careful with glass panels or doors on equipment.

DON'T continue to operate the equipment if you are in any doubt about it working normally, or if it is damaged in any way — switch off, withdraw the mains plug and consult your dealer.

DON'T remove any fixed cover as this may expose dangerous voltages.

DON'T leave equipment switched on when it is unattended unless it is specifically stated that it is designed for unattended operation or has a standby mode. Switch off using the switch on the equipment and make sure that your family knows how to do this. Special arrangements may need to be made for infirm or handicapped people.

DON'T use equipment such as personal stereos or radios so that you are distracted from the requirements of road safety. It is illegal to watch television whilst driving.

DON'T listen to headphones at high volume, as such use can permanently damage your hearing.

DON'T obstruct the ventilation of the equipment, for example with curtains or soft furnishings. Overheating will cause damage and shorten the life of the equipment.

DON'T use makeshift stands and NEVER fix legs with wood screws — to ensure complete safety always fit the manufacturer's approved stand or legs with the fixings provided according to the instructions.

DON'T allow electrical equipment to be exposed to rain or moisture.

ABOVE ALL

- NEVER let anyone especially children push anything into holes, slots or any other opening in the case — this could result in a fatal electrical shock;
- NEVER guess or take chances with electrical equipment of any kind — it is better to be safe than sorry!

Mini DV PAL

This camcorder is designed exclusively for the digital video cassette. Only cassettes marked "Mini DV" can be used with this unit.

Before recording an important scene…

…make sure you only use cassettes with the Mini DV mark Mini DV.

…remember that this camcorder is not compatible with other digital video formats.

…remember that this camcorder is intended for private consumer use only. Any commercial use without proper permission is prohibited. (Even if you record an event such as a show, performance or exhibition for personal enjoyment, it is strongly recommended that you obtain permission beforehand.)

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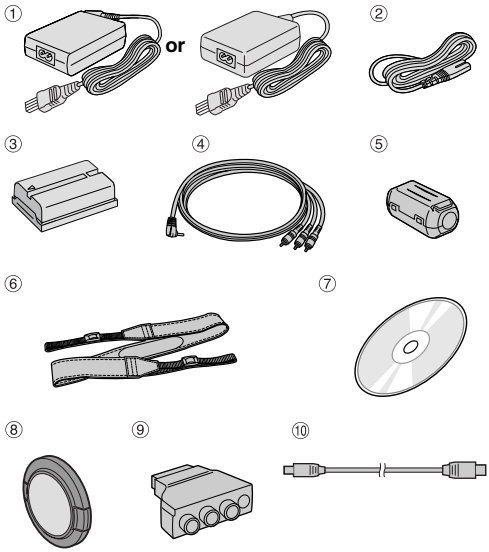
Provided Accessories



① AC Adapter AP-V14E or AP-V15E
② Power Cord
③ Battery Pack BN-V408U-B
④ Audio/Video Cable (ø3.5 mini-plug to RCA plug)
⑤ Core Filter (for USB cable and optional S-Video Cable. ☞ pg. 6 for attachment)
⑥ Shoulder Strap (See the right column for attachment)
⑦ CD-ROM
⑧ Lens Cap (See the right column for attachment)
⑨ Cable Adapter
⑩ USB cable

NOTES:

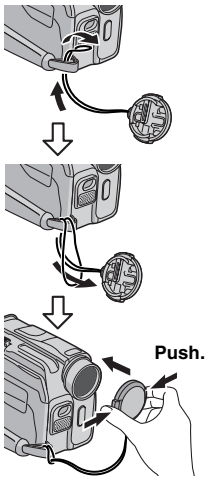
- In order to maintain optimum performance of the camcorder, provided cables may be equipped with one or more core filter. If a cable has only one core filter, the end that is closest to the filter should be connected to the camcorder.
- Make sure to use the provided cables for connections. Do not use any other cables.

How To Attach The Lens Cap

To protect the lens, attach the provided lens cap to the camcorder as shown in the illustration.

NOTE:

To confirm the lens cap is on correctly make sure the cap is flush to the camcorder.



How To Attach The Shoulder Strap

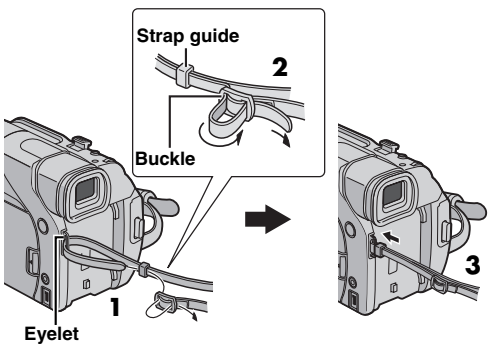
Follow the illustration.

1 Thread the strap through the eyelet.

2 Fold it back and thread it through the strap guide and the buckle.

- To adjust the length of the strap, loosen and then tighten the strap in the buckle.

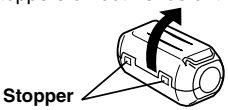
3 Slide the strap guide fully towards the eyelet.



How To Attach The Core Filter (for USB cable and optional S-Video Cable)

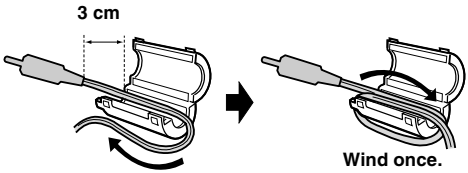
Attach the core filters to the cables. The core filter reduces interference.

1 Release the stoppers on both ends of the core filter.

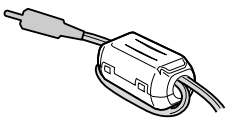


2 Run the cable through the core filter, leaving approx. 3 cm of cable between the cable plug and the core filter. Wind the cable once around the outside of the core filter as shown in the illustration.

- Wind the cable so that it is not slack.



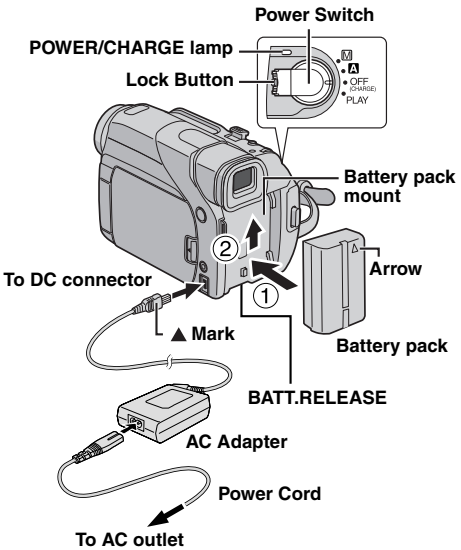
3 Close the core filter until it clicks shut.



NOTES:

- Take care not to damage the cable.
- When connecting a cable, attach the end with the core filter to the camcorder.

Power



This camcorder's 2-way power supply system lets you choose the most appropriate source of power. Do not use provided power supply units with other equipment.

Charging The Battery Pack

1 With the arrow on the battery pack pointing upward, push the battery pack slightly against the battery pack mount ①.

2 Slide up the battery pack until it locks in place ②.

3 Set the Power Switch to "OFF (CHARGE)".

4 Connect the AC Adapter to the camcorder, then connect the Power Cord to the AC Adapter.

5 Plug the AC Adapter into an AC outlet. The **POWER/CHARGE** lamp on the camcorder blinks to indicate charging has started.

6 When the **POWER/CHARGE** lamp goes out, charging is finished. Unplug the AC Adapter from the AC outlet. Disconnect the AC Adapter from the camcorder.

To detach the battery pack

Slide the battery pack down slightly while sliding **BATT. RELEASE** to detach it.

Battery pack	Charging time
BN-V408U*	Approx. 1 hr. 30 min.
BN-V416U	Approx. 3 hr.
BN-V428U	Approx. 5 hr.

* Provided

NOTES:

- If the protective cap is attached to the battery pack, remove it first.
- During charging, the camcorder cannot be operated.
- Charging is not possible if the wrong type of battery is used.

- When charging the battery pack for the first time or after a long storage period, the **POWER/CHARGE** lamp may not light. In this case, remove the battery pack from the camcorder, then try charging again.
- If the battery operation time remains extremely short even after having been fully charged, the battery is worn out and needs to be replaced. Please purchase a new one.
- **For other notes,** ☞ **pg. 27.**

Using The Battery Pack

Perform steps **1** – **2** in "Charging The Battery Pack".

Maximum continuous recording time

Battery pack	LCD monitor on	Viewfinder on
BN-V408U*	1 hr. 10 min.	1 hr. 40 min.
BN-V416U	2 hr. 20 min.	3 hr. 15 min.
BN-V428U	4 hr. 10 min.	5 hr. 50 min.

* Provided

NOTES:

- Recording time is reduced significantly under the following conditions:
  - Zoom or Record-Standby mode is engaged repeatedly.
  - The LCD monitor is used repeatedly.
  - The playback mode is engaged repeatedly.
  - The White LED Light is used.
- Before extended use, it is recommended that you prepare enough battery packs to cover 3 times the planned shooting time.

ATTENTION:

Before detaching the power source, make sure that the camcorder's power is turned off. Failure to do so can result in a camcorder malfunction.

Using AC Power

Connect the AC Adapter to the camcorder, then connect the Power Cord to the AC Adapter as shown in the illustration on page 6.

NOTES:

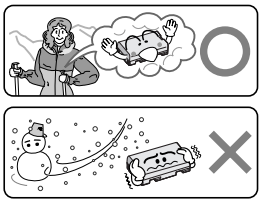
- The provided AC Adapter features automatic voltage selection in the AC range from 110 V to 240 V.
- Do not allow the DC terminals of the AC Adapter to come in contact with metals, as this can result in a short circuit and cause malfunction.
- **For other notes,** ☞ **pg. 27.**

About Batteries

DANGER! Do not attempt to take the batteries apart, or expose them to flame or excessive heat, as it may cause a fire or explosion.

WARNING! Do not allow the battery or its terminals to come in contact with metals, as this can result in a short circuit and possibly start a fire.

The Benefits Of Lithium-Ion Batteries



Lithium-ion is vulnerable in colder temperatures.

Lithium-ion battery packs are small but have a large power capacity. However, when one is exposed to cold temperatures (below 10°C), its usage time becomes shorter and it may cease to function. If this happens, place the battery pack in your pocket or other warm, protected place for a short time, then re-attach it to the camcorder. As long as the battery pack itself is not cold, it should not affect performance.
(If you're using a heating pad, make sure the battery pack does not come in direct contact with it.)

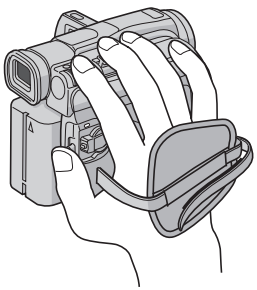
For other notes, ☞ **pg. 27.**

Grip Adjustment

1 Adjust the velcro strip.

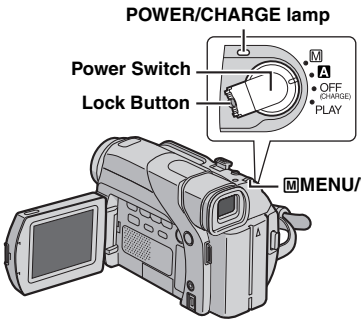
2 Pass your right hand through the loop and grasp the grip.

3 Adjust your thumb and fingers through the grip to easily operate the Recording Start/Stop Button, Power Switch and Power Zoom Lever. Be sure to fasten the velcro strip to your preference.



Operation Mode

To turn on the camcorder, set the Power Switch to any operation mode except "OFF (CHARGE)" while pressing down the Lock Button located on the switch.



Choose the appropriate operation mode according to your preference using the Power Switch.

Power Switch Position
A (Full Auto Recording): Allows you to record using NO special effects or manual adjustments. Suitable for standard recording. The "A" indicator appears on the display.
M (Manual Recording): Allows you to set various recording functions using the Menus. (☞ pg. 14) If you want more creative capabilities than Full Auto Recording, try this mode. There is no indication on the display.
OFF: Allows you to switch off the camcorder.
PLAY: ● Allows you to play back a recording on the tape. ● Allows you to set various playback functions using the Menus. (☞ pg. 14)

Power-Linked Operation

When the Power Switch is set to "A" or "M", you can also turn on/off the camcorder by opening/closing the LCD monitor or pulling out/pushing in the viewfinder.

INFORMATION:
The following explanations in this manual supposes the use of LCD monitor in your operation. If you want to use the viewfinder, close the LCD monitor and pull out the viewfinder fully.

Date/Time Settings

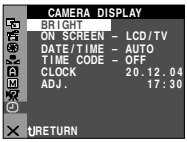
The date/time is recorded onto the tape at all times, but its display can be turned on or off during playback. (☞ pg. 14, 17)

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

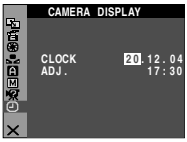
3 Press the M**MENU/VOL.** Wheel in. The Menu Screen appears.

4 Rotate the M**MENU/VOL.** Wheel to select "⚙", and press it. The CAMERA DISPLAY Menu appears.



5 Rotate the M**MENU/VOL.** Wheel to select "CLOCK ADJ.", and press it. The parameter for "Day" is highlighted.

6 Rotate the M**MENU/VOL.** Wheel to input the day, and press it. Repeat to input the month, year, hour and minute.



7 Rotate the M**MENU/VOL.** Wheel to select "↵RETURN", and press it twice. The Menu Screen closes.

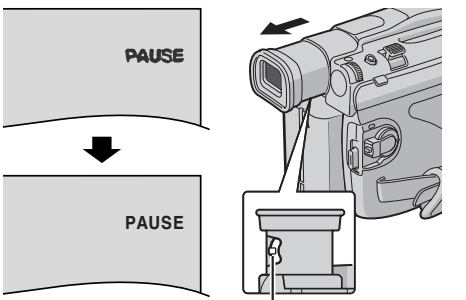
NOTE:
Even if you select "CLOCK ADJ.", if the parameter is not highlighted, the camcorder's internal clock continues to operate. Once you move the highlight bar to the first date/time parameter (day), the clock stops. When you finish setting the minute and press the M**MENU/VOL.** Wheel in, the date and time begin operation from the date and time you have just set.

Viewfinder Adjustment

1 Set the Power Switch to "A" or "M" while pressing down the Lock Button located on the switch.

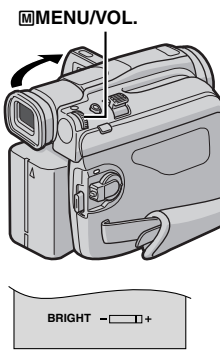
2 Make sure the LCD monitor is closed and locked. Pull out the viewfinder fully and adjust it manually for best viewability.

3 Turn the Dioptre Adjustment Control until the indications in the viewfinder are clearly focused.



CAUTION:
When retracting the viewfinder, take care not to pinch your fingers.

Brightness Adjustment Of The Display



1 Set the Power Switch to "Ⓜ" or "PLAY" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Press the Ⓜ**MENU/VOL.** Wheel in. The Menu Screen appears.

4 Rotate the Ⓜ**MENU/VOL.** Wheel to select "📷", and press it. The CAMERA DISPLAY Menu appears.

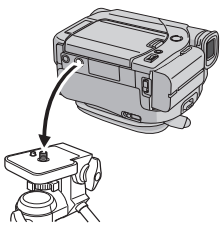
5 Rotate the Ⓜ**MENU/VOL.** Wheel to select "BRIGHT", and press it. The Menu Screen closes and the brightness control indicator appears.

6 Rotate the Ⓜ**MENU/VOL.** Wheel until the appropriate brightness is reached.

7 Press the Ⓜ**MENU/VOL.** Wheel in.

- It is also possible to adjust the brightness of the viewfinder by pulling out the viewfinder, setting "PRIORITY" in the SYSTEM Menu to "FINDER" (☞ pg. 14, 16) and adjusting as described above.

Tripod Mounting



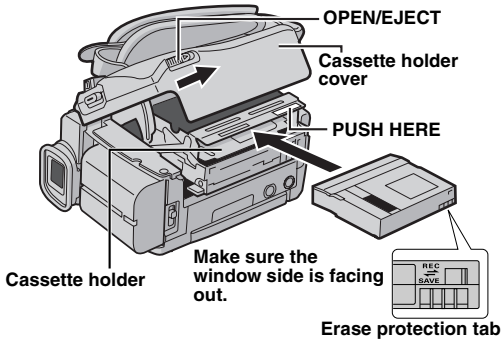
To attach the camcorder to a tripod, align the direction stud and screw to the mounting socket and stud hole on the camcorder. Then tighten the screw clockwise.

- Some tripods are not equipped with studs.

CAUTION:
When attaching the camcorder to a tripod, extend its legs to stabilise the camcorder. It is not advised to use small sized tripods. This may cause damage to the unit by falling over.

Loading/Unloading A Cassette

The camcorder needs to be powered up to load or eject a cassette.



1 Slide and hold **OPEN/EJECT** in the direction of the arrow, then pull the cassette holder cover open until it locks. The cassette holder opens automatically.

- Do not touch internal components.

2 Insert or remove a tape and press "PUSH HERE" to close the cassette holder.

- Be sure to press only the section labelled "PUSH HERE" to close the cassette holder; touching other parts may cause your finger to get caught in the cassette holder, resulting in injury or product damage.
- Once the cassette holder is closed, it recedes automatically. Wait until it recedes completely before closing the cassette holder cover.
- When the battery pack's charge is low, you may not be able to close the cassette holder cover. Do not apply force. Replace the battery pack with a fully charged one or use AC power before continuing.

3 Close the cassette holder cover firmly until it locks into place.

Approximate recording time

Tape	Recording mode	
	SP	LP
30 min.	30 min.	45 min.
60 min.	60 min.	90 min.
80 min.	80 min.	120 min.

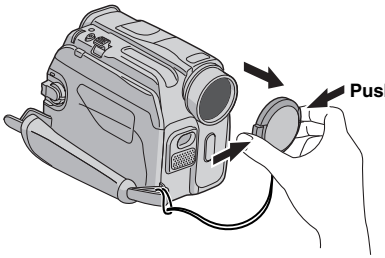
To switch the recording mode, refer to pages 14 and 15.

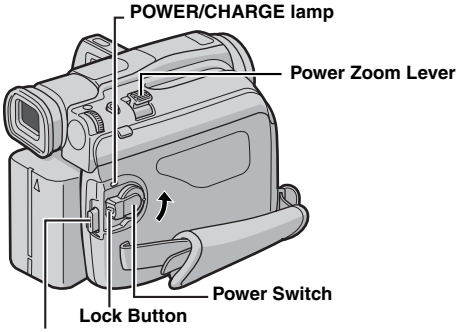
To protect valuable recordings
Slide the erase protection tab on the back of the tape in the direction of "SAVE". This prevents the tape from being recorded over. To record on this tape, slide the tab back to "REC" before loading it.

For other notes, ☞ pg. 27.

Basic Recording

NOTE:
Before continuing, perform the procedures listed below:
- Power (☞ pg. 6)
- Loading a Cassette (☞ pg. 9)





1 Remove the lens cap.

2 Open the LCD monitor fully. (See the right column)

3 Set the Power Switch to "A" or "M" while pressing down the Lock Button located on the switch.
- The **POWER/CHARGE** lamp lights and the camcorder enters the Record-Standby mode. "PAUSE" is displayed.
- To record in LP (Long Play) mode, ☞ pg. 14, 15.

4 To start recording, press the Recording Start/Stop Button. The "● REC" appears on the display while recording is in progress.

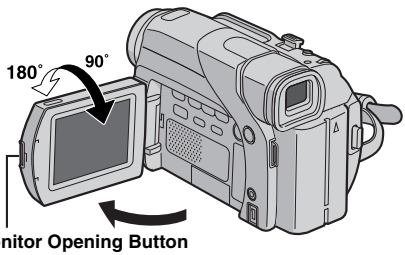
5 To stop recording, press the Recording Start/Stop Button again. The camcorder re-enters the Record-Standby mode.

NOTES:
- The image will not appear simultaneously on the LCD monitor and the viewfinder.
- If the Record-Standby mode continues for 5 minutes, the camcorder's power shuts off automatically. To turn the camcorder on again, push back and pull out the viewfinder again or close and re-open the LCD monitor.
- LCD monitor/viewfinder indications:
  - When power is supplied from a battery: the "▭" battery indicator is displayed. (☞ pg. 31)
  - When power is supplied from an AC outlet: the "▭" battery indicator does not appear.
- When a blank portion is left between recorded scenes on the tape, the time code is interrupted and errors may occur when editing the tape. To avoid this, refer to "Recording From The Middle Of A Tape" (☞ pg. 11).
- To turn the beep sounds off, ☞ pg. 14, 16.
- **For other notes, ☞ pg. 27.**

LCD Monitor And Viewfinder

While using the LCD monitor:
Make sure the viewfinder is pushed back in. Press the Monitor Opening Button and open the LCD monitor fully. It can rotate 270° (90° downward, 180° upward).

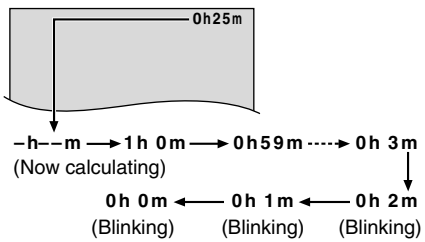
While using the viewfinder:
Make sure the LCD monitor is closed and locked. Pull out the viewfinder fully.
- Be sure to pull out the viewfinder until you hear a click, otherwise it may be pushed back in during use.



NOTES:
- The image will not appear simultaneously on the LCD monitor and the viewfinder. When the viewfinder is pulled out while the LCD monitor is opened, you can select which one to use. Set "PRIORITY" to the desired mode in SYSTEM Menu. (☞ pg. 14, 16)
- Coloured bright spots may appear all over the LCD monitor or the viewfinder. However, this is not a malfunction. (☞ pg. 30)

Tape Remaining Time

Approximate tape remaining time appears on the display. "– h – – m" means the camcorder is calculating the remaining time. When the remaining time reaches 2 minutes, the indication starts blinking.

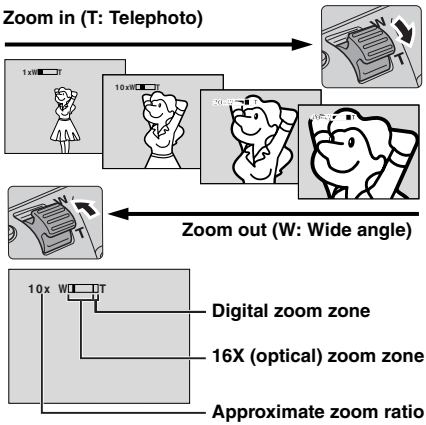


Zooming

Produces the zoom in/out effect, or an instantaneous change in image magnification.

Zoom In
Slide the Power Zoom Lever towards "T".

Zoom Out
Slide the Power Zoom Lever towards "W".
- The further you slide the Power Zoom Lever, the quicker the zoom action.



NOTES:

- Focusing may become unstable during Zooming. In this case, set the zoom while in Record-Standby, lock the focus by using the manual focus (☞ pg. 21), then zoom in or out in Record mode.
- Zooming is possible to a maximum of 700X, or it can be switched to 16X magnification using the optical zoom. (☞ pg. 15)
- Zoom magnification of over 16X is done through Digital image processing, and is therefore called Digital Zoom.
- During Digital zoom, the quality of image may suffer.
- Macro shooting (as close as approx. 5 cm to the subject) is possible when the Power Zoom Lever is set all the way to "W". Also see "TELE MACRO" in MANUAL Menu on page 15.

Journalistic Shooting

In some situations, different shooting angles may provide more dramatic results. Hold the camcorder in the desired position and tilt the LCD monitor in the most convenient direction. It can rotate 270° (90° downward, 180° upward).

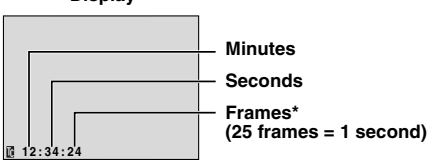
Self Recording

Open the LCD monitor and tilt it upward to 180° so that it faces forward, then point the lens toward yourself and start recording.

Self Recording

Time Code

During recording, a time code is recorded on the tape. This code is to confirm the location of the recorded scene on the tape during playback.



* Frames are not displayed during recording.

If recording starts from a blank portion, the time code begins counting from "00:00:00" (minute:second:frame). If recording starts from the end of a previously recorded scene, the time code continues from the last time code number.

If during recording a blank portion is left partway through the tape, the time code is interrupted. When recording is resumed, the time code starts counting up again from "00:00:00". This means the camcorder may record the same time codes as those existing in a previously recorded scene. To prevent this, perform "Recording From The Middle Of A Tape" (See below) in the following cases;

- When shooting again after playing back a recorded tape.
- When power shuts off during shooting.
- When a tape is removed and re-inserted during shooting.
- When shooting using a partially recorded tape.
- When shooting on a blank portion located partway through the tape.
- When shooting again after shooting a scene then opening/closing the cassette holder cover.

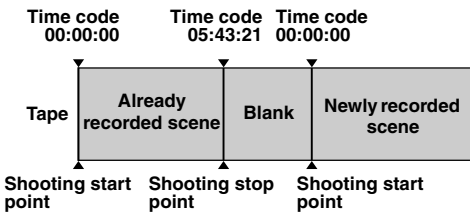
Recording From The Middle Of A Tape

1) Play back a tape or use Blank Search (☞ pg. 12) to find the spot at which you want to start recording, then engage the Still Playback mode. (☞ pg. 12)
2) Set the Power Switch to "A" or "M" while pressing down the Lock Button located on the switch, then start recording.

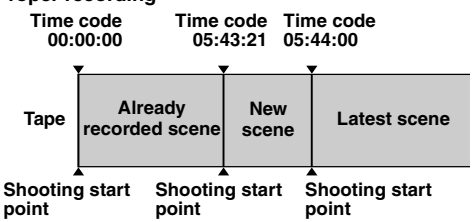
NOTES:

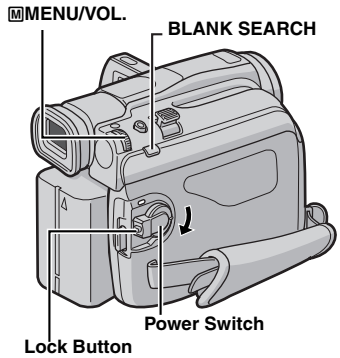
- The time code cannot be reset.
- During fast-forwarding and rewinding, the time code indication does not move smoothly.
- The time code is displayed only when "TIME CODE" is set to "ON". (☞ pg. 16)

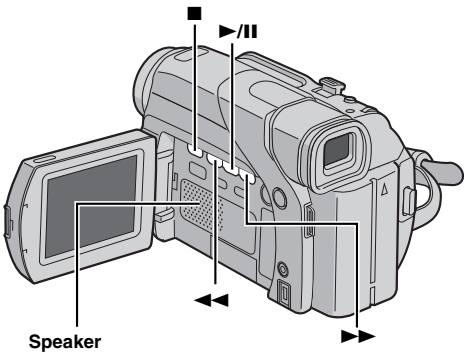
When a blank portion is recorded on a tape



Proper recording







Normal Playback

1 Load a cassette. (☞ pg. 9)

2 Set the Power Switch to "PLAY" while pressing down the Lock Button located on the switch.

3 To start playback, press **►/II**.

4 To stop playback, press **■**.

- During Stop mode, press **◄◄** to rewind, or **►►** to fast-forward the tape.

To control the speaker volume

Rotate the **MENU/VOL.** Wheel towards "+" to turn up the volume, or towards "–" to turn down the volume.

NOTES:

- The playback picture can be viewed in the LCD monitor, viewfinder or on a connected TV. (☞ pg. 13)
- **For other notes, ☞ pg. 27.**

Still Playback

Pauses during video playback.

1) Press **►/II** during playback.

2) To resume normal playback, press **►/II** again.

- If still playback continues for more than about 3 minutes, the camcorder's Stop mode is automatically engaged.
- When **►/II** is pressed, the image may not pause immediately while the camcorder stabilises the still image.

Shuttle Search

Allows high-speed search in either direction during video playback.

1) During playback, press **►►** for forward search, or **◄◄** for reverse search.

2) To resume normal playback, press **►/II**.

- During playback, press and hold **►►** or **◄◄**. The search continues as long as you hold the button. Once you release the button, normal playback resumes.
- A slight mosaic effect appears on the display during Shuttle Search. This is not a malfunction.

ATTENTION:

During Shuttle Search, parts of the picture may not be clearly visible, particularly on the left side of the screen.

Blank Search

Helps you find where you should start recording in the middle of a tape to avoid time code interruption. (☞ pg. 11)

1 Load a cassette. (☞ pg. 9)

2 Set the Power Switch to "PLAY" while pressing down the Lock Button located on the switch.

3 During Stop mode, press **BLANK SEARCH**.

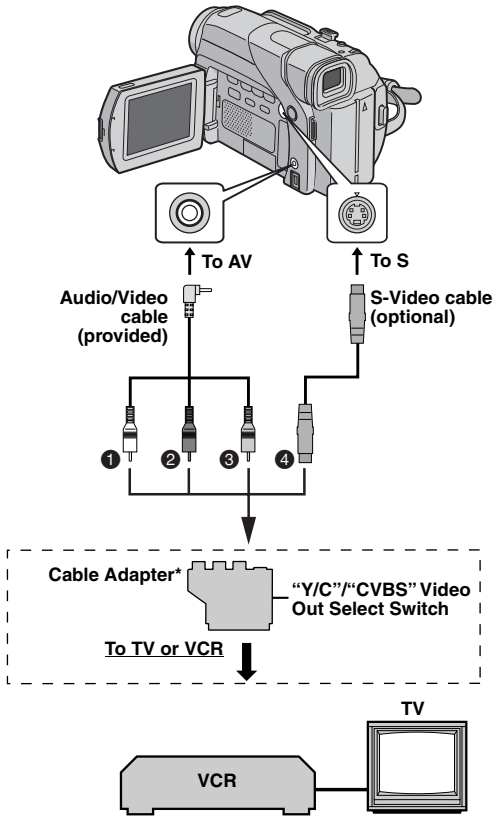
- The "BLANK SEARCH" indication appears and the camcorder automatically starts reverse or forward search, then stops at the spot which is about 3 seconds of tape before the beginning of the detected blank portion.
- To cancel Blank Search midway, press **■**.

NOTES:

- Before starting Blank Search, if the current position is at a blank portion, the camcorder searches in the reverse direction. If the current position is at a recorded portion, the camcorder searches in the forward direction.
- Blank Search does not work if "USE CLEANING CASSETTE" has appeared with the tape.
- If the beginning or end of the tape is reached during Blank Search, the camcorder stops automatically.
- A blank portion which is shorter than 5 seconds of tape may not be detected.
- The detected blank portion may be located between recorded scenes. Before you start recording, make sure there is no recorded scene after the blank portion.

Connections To A TV Or VCR

These are some basic types of connections. When making the connections, refer also to your VCR and TV instruction manuals.



❶ White to AUDIO L IN**
❷ Red to AUDIO R IN**
❸ Yellow to VIDEO IN
❹ To S-VIDEO IN***

* If your VCR has a SCART connector, use the provided cable adapter.
** Not required for watching still images only.
*** Connect when your TV/VCR has S-VIDEO IN and A/V input connectors. In this case, it is not necessary to connect the yellow video cable.

NOTE:

Set the video out select switch of the cable adapter as required:
Y/C: When connecting to a TV or VCR which accepts Y/C signals and uses an S-Video cable.
CVBS: When connecting to a TV or VCR which does not accept Y/C signals and uses an audio/video cable.

1 Make sure all units are turned off.

2 Connect the camcorder to a TV or VCR as shown in the illustration.

If using a VCR, go to step **3**.
If not, go to step **4**.

3 Connect the VCR output to the TV input, referring to your VCR's instruction manual.

4 Turn on the camcorder, the VCR and the TV.

5 Set the VCR to its AUX input mode, and set the TV to its VIDEO mode.

To choose whether or not the following displays appear on the connected TV

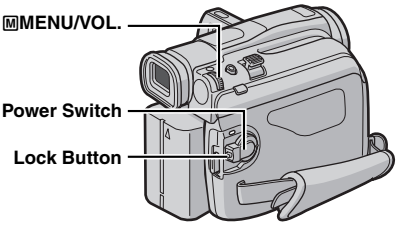
- Date/Time
  Set "DATE/TIME" to "AUTO", "ON" or "OFF". (☞ pg. 14, 17)
- Time Code
  Set "TIME CODE" to "ON" or "OFF". (☞ pg. 14, 17)
- Indications other than date/time and time code
  Set "ON SCREEN" to "OFF", "LCD" or "LCD/TV". (☞ pg. 14, 17)

NOTES:

- **It is recommended to use the AC Adapter as the power supply instead of the battery pack. (☞ pg. 7)**
- To monitor the picture and sound from the camcorder without inserting a tape, set the camcorder's Power Switch to "A" or "M", then set your TV to the appropriate input mode.
- Make sure you adjust the TV sound volume to its minimum level to avoid a sudden burst of sound when the camcorder is turned on.
- If you have a TV or speakers that are not specially shielded, do not place the speakers adjacent to the TV as interference will occur in the camcorder playback picture.
- When a cable is connected to the AV connector, the sound is not heard from the speaker.

Changing The Menu Settings

This camcorder is equipped with an easy-to-use, on-screen menu system that simplifies many of the more detailed camcorder settings. (☞ pg. 15 – 17)



1 For Video Recording Menus:
Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

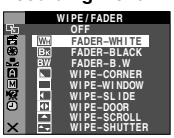
For Video Playback Menus:
Set the Power Switch to "PLAY" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

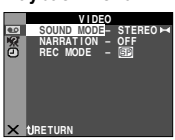
3 Press the **MMENU/VOL.** Wheel in. The Menu Screen appears.

4 Rotate the **MMENU/VOL.** Wheel to select the desired function, and press it. The selected function menu appears.

Screen for Video Recording Menu



Screen for Video Playback Menu



5 Setting procedure hereafter depends on the selected function.

Menus without Sub Menus

- **WIPE/FADER (☞ pg. 19)**
- **PROGRAM AE (☞ pg. 19)**
- **EXPOSURE (☞ pg. 22)**
- **W. BALANCE (☞ pg. 23)**

1) Rotate the **MMENU/VOL.** Wheel to select the desired parameter.
- Example: PROGRAM AE Menu

2) Press the **MMENU/VOL.** Wheel in. Selection is complete. The Menu Screen returns.
- Repeat the procedure if you wish to set other function menus.

3) Press the **MMENU/VOL.** Wheel in again. The Menu Screen closes.

Selected menu icon blinks.

Selected parameter

Menus with Sub Menus

- **CAMERA (☞ pg. 15)**
- **MANUAL (☞ pg. 15)**
- **SYSTEM (☞ pg. 16)**
- **CAMERA DISPLAY (☞ pg. 16)**
- **VIDEO (☞ pg. 17)**
- **VIDEO DISPLAY (☞ pg. 17)**

1) Rotate the **MMENU/VOL.** Wheel to select the desired function, and press it. The Sub Menu appears.
- Example: CAMERA Menu

2) Rotate the **MMENU/VOL.** Wheel to select the desired parameter.

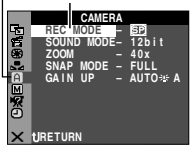
3) Press the **MMENU/VOL.** Wheel in. Selection is complete.
- Repeat the procedure if you wish to set other function menus.

4) Press the **MMENU/VOL.** Wheel in. The Menu Screen returns.
- Repeat the procedure if you wish to set other function menus.

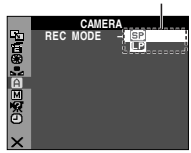
5) Press the **MMENU/VOL.** Wheel in again. The Menu Screen closes.

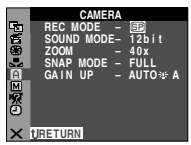
Selected menu icon blinks.

Selected function



Sub Menu





Recording Menus

A CAMERA

The "A" settings are effective when the Power Switch is set to both "A" and "M". However, the menu settings can be changed only when the Power Switch is set to "M".
[ ] = Factory-preset

REC MODE

[SP]: To record in the SP (Standard Play) mode
LP: Long Play—more economical, providing 1.5 times the recording time.

NOTES:
- If the recording mode is switched, the playback picture will be blurred at the switching point.
- It is recommended that tapes recorded in the LP mode on this camcorder be played back on this camcorder.
- During playback of a tape recorded on another camcorder, blocks of noise may appear or there may be momentary pauses in the sound.

SOUND MODE

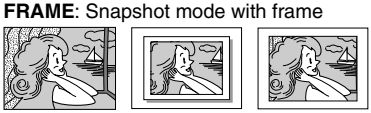
[12 bit]: Enables video recording of stereo sound on four separate channels, and is recommended for use when performing Audio Dubbing. (Equivalent to the 32 kHz mode of previous models)
16 bit: Enables video recording of stereo sound on two separate channels. (Equivalent to the 48 kHz mode of previous models)

ZOOM

16X: When set to "16X" while using digital zoom, the zoom magnification will reset to 16X since digital zoom will be disengaged.
[40X]: Allows you to use the Digital Zoom. By digitally processing and magnifying images, zooming is possible from 16X (the optical zoom limit), to a maximum of 40X digital magnification.
700X: Allows you to use the Digital Zoom. By digitally processing and magnifying images, zooming is possible from 16X (the optical zoom limit), to a maximum of 700X digital magnification.

SNAP MODE

[FULL]: Snapshot mode with no frame
PIN-UP: Pin-Up mode
FRAME: Snapshot mode with frame



[FULL] **PIN-UP** **FRAME**

For details on the procedure, refer to "Snapshot (For Video Recording)" (☞ pg. 20).

GAIN UP

OFF: Allows you to shoot dark scenes with no picture brightness adjustment.
[AGC]: The overall appearance may be grainy, but the image is bright.
AUTO ☼A : The shutter speed is automatically adjusted. Shooting a subject in low or poor lighting at slow shutter speed provides a brighter image than in the AGC mode, but the subject's movements are not smooth or natural. The overall appearance may be grainy. While the shutter speed is being automatically adjusted, "☼A" is displayed.

M MANUAL

The "M" settings are effective only when the Power Switch is set to "M".
[ ] = Factory-preset

DIS

OFF: Disables the function.
[ON]: To compensate for unstable images caused by camera-shake, particularly at high magnification.

NOTES:
- Accurate stabilisation may not be possible if hand shake is excessive, or under the following conditions:
  - When shooting subjects with vertical or horizontal stripes.
  - When shooting dark or dim subjects.
  - When shooting subjects with excessive backlighting.
  - When shooting scenes with movement in various directions.
  - When shooting scenes with low-contrast backgrounds.
- Switch off this mode when recording with the camcorder on a tripod.
- The "" indicator blinks or goes out if the Stabiliser cannot be used.

TELE MACRO

[OFF]: Disables the function.
ON: Usually the distance to a subject where the lens is in focus depends on the zoom magnification. Unless there is a distance more than 1 m to the subject, the lens is out of focus at the maximum telephoto setting. When set to "ON", you can shoot a subject as large as possible at a distance of approx. 60 cm.

NOTE:
Depending on the zoom position, the lens may go out of focus.

WIDE MODE

[OFF]: Records with no change in the screen ratio. For playback on a TV with a normal screen ratio.
CINEMA: Inserts black bands at the top and bottom of the screen. The indicator appears. During playback on wide-screen TVs, the black bands at the top and bottom of the screen are cut and the screen ratio becomes 16:9. When using this mode, refer to your wide-screen TV's instruction manual. During playback/recording on 4:3 TVs/LCD monitor/viewfinder, black bands are inserted at the top and bottom of the screen and the image appears like a letter boxed 16:9 movie.
SQUEEZEW: For playback on TVs with an aspect ratio of 16:9. Naturally expands the image to fit the screen without distortion. The W indicator appears. When using this mode, refer to your wide-screen TV's instruction manual. During playback/recording on 4:3 TVs/LCD monitor/viewfinder, the image is elongated vertically.

WIND CUT

[OFF]: Disengages the function.
ON : Helps cut down on noise created by wind. The "" indicator appears. The quality of the sound will change. This is normal.

SYSTEM

The "SYSTEM" functions which are set when the Power Switch is set to "M" are also applied when the Power Switch is set to "PLAY".
[ ] = Factory-preset

BEEP

OFF: Turns off sounds when performing any operations. It also deactivates the shutter sound effect, however the shutter sound is recorded onto the tape during Snapshot for Video Recording (☞ pg. 20).
BEEP: The beep sounds when the power is turned on or off, and at the beginning and end of recording. It also activates the shutter sound effect. (☞ pg. 20)
[MELODY]: Instead of a beep, a melody sounds when any operation is performed. It also activates the shutter sound effect. (☞ pg. 20)

DEMO MODE

OFF: Automatic demonstration will not take place.
[ON]: Demonstrates certain functions such as Program AE with special effects, etc., and can be used to confirm how these functions operate. Demonstration starts in the following cases:
- When the Menu Screen is closed after "DEMO MODE" is turned "ON".
- With "DEMO MODE" set to "ON", if there is no operation for about 3 minutes after the Power Switch is set to "A" or "M".

Performing any operation during the demonstration stops the demonstration temporarily. If no operation is performed for more than 3 minutes after that, the demonstration will resume.

NOTES:
- If a cassette is in the camcorder, the demonstration cannot be turned on.
- "DEMO MODE" remains "ON" even if the camcorder power is turned off.
- If "DEMO MODE" remains "ON", some functions will not be available. After viewing demo, set to "OFF".

PRIORITY

[LCD]: The image is displayed on the LCD monitor when the viewfinder is pulled out while the LCD monitor is opened.
FINDER: The image is displayed in the viewfinder when the viewfinder is pulled out while the LCD monitor is opened.

CAM RESET

EXECUTE: Resets all settings to the factory-preset.
RETURN: Does not reset all settings to the factory-preset.

CAMERA DISPLAY

- The "CAMERA DISPLAY" settings are effective even when the Power Switch is set to "A". However, the menu settings can be changed only when the Power Switch is set to "M".
- The "CAMERA DISPLAY" settings are effective only for shooting except "BRIGHT".

[ ] = Factory-preset

BRIGHT

☞ pg. 9, "Brightness Adjustment Of The Display"

ON SCREEN

LCD: Keeps the camcorder's display (except the date, time and time code) from appearing on the connected TV screen.
[LCD/TV]: Makes the camcorder's display appear on screen when the camcorder is connected to a TV.

DATE/TIME

OFF: The date/time does not appear.
[AUTO]: Displays the date/time for approx. 5 seconds when the Power Switch is set from "OFF" to "A" or "M".
ON: The date/time is always displayed.

TIME CODE

[OFF]: Time code is not displayed.
ON: Time code is displayed on the camcorder and on the connected TV. Frame numbers are not displayed during recording. (☞ pg. 11)

CLOCK ADJ.

☞ pg. 8, "Date/Time Settings"

Playback Menus

VIDEO

[ ] = Factory-preset

SOUND MODE and NARRATION
During tape playback, the camcorder detects the sound mode in which the recording was made, and plays the sound back. Select the type of sound to accompany your playback picture. According to the menu access explanation on page 14, select “SOUND MODE” or “NARRATION” from the Menu Screen and set it to the desired parameter.

SOUND MODE

[STEREO]: Sound is output on both “L” and “R” channels in stereo.
SOUND L : Sound from the “L” channel is output.
SOUND R : Sound from the “R” channel is output.

NARRATION

[OFF]: Original sound is output on both “L” and “R” channels in stereo.
ON: Dubbed sound is output on both “L” and “R” channels in stereo.
MIX: Original and dubbed sounds are combined and output in stereo on both “L” and “R” channels.

NOTES:

- The “SOUND MODE” setting is available for both 12-bit and 16-bit sound. (In previous models’ functions, “12-bit” is called “32 kHz” and “16-bit” is called “48 kHz”.)
- The camcorder cannot detect the sound mode in which the recording was made during fast-forward or rewind. During playback the sound mode is displayed in the upper left corner.

REC MODE **[SP]** / **LP**

Allows you to set the video recording mode (SP or LP) depending on your preference. It is recommended you use “REC MODE” in VIDEO Menu when using this camcorder as a recorder during dubbing. (☞ pg. 25)

NOTE:

“REC MODE” can be set when the Power Switch is set to “PLAY” or “M”.

SYSTEM

Each setting is linked with “”, which appears when the Power Switch is set to “M”. (☞ pg. 14)

- The parameters are the same as in the description on page 16.

[ ] = Factory-preset

BEEP **OFF** / **BEEP** / **[MELODY]**

DEMO MODE **OFF** / **[ON]**

PRIORITY **[LCD]** / **FINDER**

CAM RESET **EXECUTE** / **RETURN**

VIDEO DISPLAY

The “” (VIDEO DISPLAY) settings are effective only for video playback except “BRIGHT”.

- The parameters (except “OFF” in ON SCREEN settings) are the same as in the description on page 16.

[ ] = Factory-preset

BRIGHT

☞ pg. 9, “Brightness Adjustment Of The Display”

ON SCREEN **OFF** / **[LCD]** / **LCD/TV**

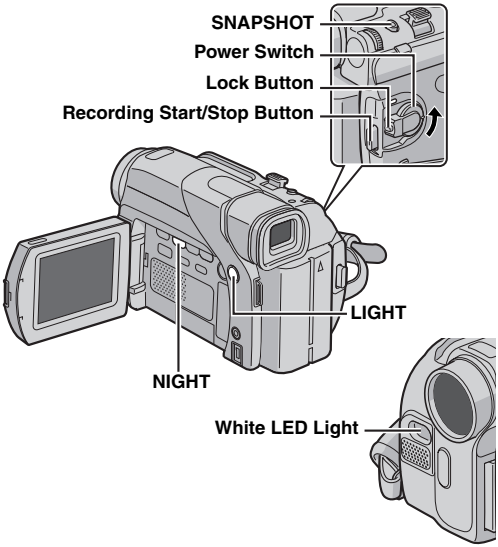
When set to “OFF”, the camcorder’s display disappears.

DATE/TIME **[OFF]** / **AUTO** / **ON**

When set to “AUTO”, the date/time are displayed in the following cases:

- When playback starts. The camcorder displays the date/time when scenes are recorded.
- When the date is changed during playback.

TIME CODE **[OFF]** / **ON**



White LED Light

White LED Light can be used to brighten the subject in the dark place during video recording.

1 Press **LIGHT** repeatedly to change the setting.

OFF: Turns off the light.
ON: The light is on always. (☼ appears.)
AUTO: The light turns on automatically when dark. (☼**A** appears.)

2 Press the Recording Start/Stop Button to start video recording or **SNAPSHOT** to shoot a still image.

NOTES:

- Be careful not to point the LED Light directly to eyes.
- If the light does not reach the subject, the Night-Scope function will be activated, and makes it possible to shoot the subject brighter.
- There is a difference in the brightness of the images shot between the centre area which is illuminated by the LED Light and the surrounding areas (which will be darker).
- Since subjects are shot at a reduced shutter speed when the White LED Light setting is “ON”, they will appear slightly blurred.

Night Scope

Makes dark subjects or areas even brighter than they would be under good natural lighting. Although the recorded image is not grainy, it may look as if it is strobing due to the slow shutter speed.

1 Set the Power Switch to “M” while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

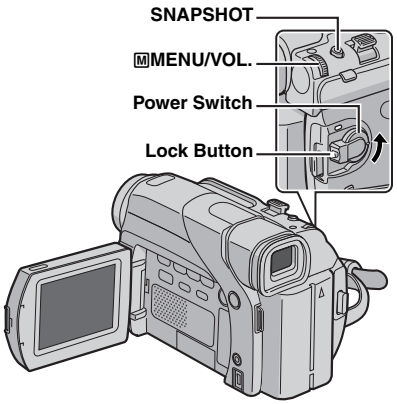
3 Press **NIGHT** so that the Night-Scope indicator “0,0” appears.

- The shutter speed is automatically adjusted to provide up to 30 times sensitivity.
- “**A**” appears beside “0,0” while the shutter speed is being automatically adjusted.

To deactivate Night-Scope
Press **NIGHT** again so that the Night-Scope indicator disappears.

NOTES:

- During Night-Scope, the following functions or settings cannot be activated and its indicator blinks or goes out:
  - Some modes of “Program AE With Special Effects” (☞ pg. 19).
  - “GAIN UP” in CAMERA Menu. (☞ pg. 15)
  - “DIS” in MANUAL Menu. (☞ pg. 15)
- During Night-Scope, it may be difficult to bring the camcorder into focus. To prevent this, use of a tripod is recommended.



Wipe Or Fader Effects

IMPORTANT:
Some Wipe/Fader Effects cannot be used with certain modes of Program AE with special effects. (See the right column.) If an unusable Wipe/Fader Effect is selected, its indicator blinks in blue or goes out.

These effects let you make pro-style scene transitions. Use them to spice up the transition from one scene to the next.

Wipe or Fader works when video recording is started or stopped.

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Set "WIPE/FADER" to the desired mode. (☞ pg. 14)
- The WIPE/FADER menu disappears and the effect is reserved.
- The selected effect indicator appears.

4 Press the Recording Start/Stop Button to activate the Fade-in/out or Wipe-in/out.

To deactivate the selected effect
Select "OFF" in step **3**. The effect indicator disappears.

NOTE:
You can extend the length of a Wipe or Fader by pressing and holding the Recording Start/Stop Button.

WIPE/FADER

OFF: Disables the function. (Factory-preset)

FADER–WHITE: Fade in or out with a white screen.

FADER–BLACK: Fade in or out with a black screen.

FADER–B.W: Fade in to a colour screen from a black and white screen, or fade out from colour to black and white.

WIPE–CORNER: Wipe in on a black screen from the upper right to the lower left corner, or wipe out from lower left to upper right, leaving a black screen.

WIPE–WINDOW: The scene starts in the centre of a black screen and wipes in toward the corners, or comes in from the corners, gradually wiping out to the centre.

WIPE–SLIDE: Wipe in from right to left, or wipe out from left to right.

WIPE–DOOR: Wipe in as the two halves of a black screen open to the left and right, revealing the scene, or wipe out and the black screen reappears from left and right to cover the scene.

WIPE–SCROLL: The scene wipes in from the bottom to the top of a black screen, or wipes out from top to bottom, leaving a black screen.

WIPE–SHUTTER: Wipe in from the centre of a black screen toward the top and bottom, or wipe out from the top and bottom toward the centre leaving a black screen.

Program AE With Special Effects

IMPORTANT:
Some modes of Program AE with special effects cannot be used with certain Wipe/Fader effects. (See the left column.) If an unusable mode is selected, the indicator of Program AE with Special Effects blinks or goes out.

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Set "PROGRAM AE" to the desired mode. (☞ pg. 14)
- The PROGRAM AE menu disappears and the selected effect is activated.
- The selected effect indicator appears.

To deactivate the selected effect
Select "OFF" in step **3**. The effect indicator disappears.

NOTES:
- Program AE with special effects can be changed during recording or during Record-Standby.
- Some modes of Program AE with special effects cannot be used during Night-Scope.

PROGRAM AE

OFF: Disables the function. (Factory-preset)

SHUTTER 1/50: The shutter speed is fixed at 1/50th of a second. Black bands that usually appear when shooting a TV screen become narrower.

SHUTTER 1/120: The shutter speed is fixed at 1/120th of a second. The flickering that occurs when shooting under a fluorescent light or mercury-vapour lamp is reduced.

SPORTS
(Variable Shutter Speed: 1/250 – 1/4000)
This setting allows fast-moving images to be captured one frame at a time, for vivid, stable slow-motion playback. The faster the shutter speed, the darker the picture becomes. Use the shutter function under good lighting conditions.

CONTINUED ON NEXT PAGE

SNOW: Compensates for subjects that may otherwise appear too dark when shooting in extremely bright surroundings such as in the snow.

SPOTLIGHT: Compensates for subjects that may otherwise appear too bright when shooting under extremely strong direct lighting such as spotlights.

NOTE:
"SPOTLIGHT" has the same effect as –3 with the exposure control. (☞ pg. 22)

TWILIGHT: Makes evening scenes look more natural. White Balance (☞ pg. 23) is automatically set to "☀", but can be changed to your desired setting. When Twilight is chosen, the camcorder automatically adjusts the focus from approx. 10 m to infinity. From less than 10 m, adjust the focus manually.

SEPIA: Recorded scenes have a brownish tint like old photos. Combine this with the Cinema mode for a classic look.

MONOTONE: Like classic black and white films, your footage is shot in B/W. Used together with the Cinema mode, it enhances the "classic film" effect.

CLASSIC FILM: Gives recorded scenes a strobe effect.

STROBE: Your recording looks like a series of consecutive snapshots.

Snapshot (For Video Recording)

This feature lets you record still images that look like photographs onto a tape.

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Set "SNAP MODE" to the desired mode. (☞ pg. 14, 15)

4 Press **SNAPSHOT**.

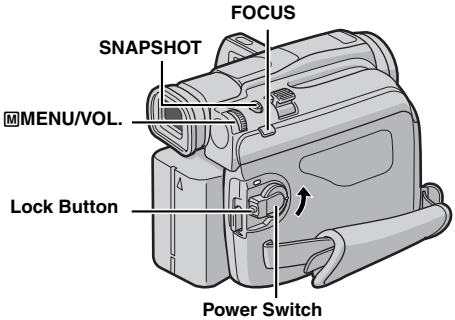
- There is the sound effect of a shutter closing.
- The "PHOTO" indication appears and a still image will be recorded for approx. 6 seconds, then the camcorder re-enters the Record-Standby mode.
- You can perform Snapshot also during recording. A still image will be recorded for approx. 6 seconds, then the normal recording resumes.
- Regardless of the Power Switch position ("A" or "M"), Snapshot recording takes place using the selected Snapshot mode.

NOTES:

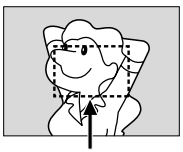
- To remove the shutter sound, refer to "BEEP" on page 16.
- When "WIDE MODE" is set to "SQUEEZE W" (☞ pg. 15), the "PHOTO" indication blinks in blue and Snapshot recording becomes impossible.
- If Program AE with special effects (☞ pg. 19) is engaged, certain modes of Program AE with special effects are disabled during Snapshot recording. In such a case, the icon blinks.
- If **SNAPSHOT** is pressed when "DIS" is set to "ON" (☞ pg. 15), the Stabiliser will be disabled.
- During Snapshot recording, the image displayed in the viewfinder may be partially missing. However, there is no effect in the recorded image.
- When a cable is connected to the AV connector, the shutter sound is not heard from the speaker, however it is recorded onto the tape.

Motor Drive Mode

Keeping **SNAPSHOT** pressed in step **4** provides an effect similar to serial photography. (Interval between still images: approx. 1 second)



Auto Focus


Focus detection zone

The camcorder's Full Range AF system offers continuous shooting ability from close-up (as close as approx. 5 cm to the subject) to infinity.
However, correct focus may not be obtainable in the situations listed below (in these cases perform "Manual Focus"):

- When two subjects overlap in the same scene.
- When illumination is low.*
- When the subject has no contrast (difference in brightness and darkness), such as a flat, one-colour wall, or a clear, blue sky.*
- When a dark object is barely visible in the LCD monitor or the viewfinder.*
- When the scene contains minute patterns or identical patterns that are regularly repeated.
- When the scene is affected by sunbeams or light reflecting off the surface of a body of water.
- When shooting a scene with a high-contrast background.

* The following low-contrast warnings appear blinking: ▲, ◀, ▶ and 👤

NOTES:

- If the lens is smeared or blurred, accurate focusing is not possible. Keep the lens clean. (☞ pg. 34) When condensation occurs, wipe with a soft cloth or wait for it to dry naturally.
- When shooting a subject close to the lens, zoom out first. (☞ pg. 10) If zoomed-in in the auto focus mode, the camcorder may automatically zoom out depending on the distance between the camcorder and the subject. This will not occur when "TELE MACRO" is set to "ON". (☞ pg. 15)

Manual Focus

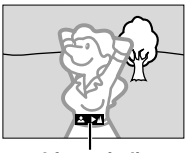
NOTE:
If you are using the viewfinder, you should already have performed "Viewfinder Adjustment" (☞ pg. 8).

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Press **FOCUS**. The manual focus indicator appears.

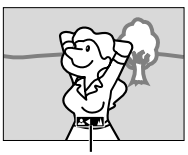
3 To focus on a further subject, rotate the **MMENU/VOL.** Wheel towards "+". The "▶" indicator appears and blinks.

While focusing on a further subject


Manual focus indicator

To focus on a nearer subject, rotate the **MMENU/VOL.** Wheel towards "–". The "◀" indicator appears and blinks.

While focusing on a nearer subject


Manual focus indicator

To reset to Auto Focus
Press **FOCUS** twice or set the Power Switch to "A".
If **FOCUS** is pressed once, the camcorder will enter the focus adjustment mode again.

NOTES:

- Be sure to focus the lens in the maximum telephoto position when you use the Manual Focus mode. If you focus in on a subject in the wide-angle position, sharply focused images cannot be obtained when zoomed up because the depth-of-field is reduced at longer focal lengths.
- When the focus level cannot be adjusted any further or closer, "▲" or "👤" will blink.

Exposure Control

Manual exposure control is recommended in the following situations:
- When shooting using reverse lighting or when the background is too bright.
- When shooting on a reflective natural background such as at the beach or when skiing.
- When the background is overly dark or the subject is bright.

1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Press the **MENU/VOL.** Wheel in. The Menu Screen appears.

4 Rotate the **MENU/VOL.** Wheel to select "EXPOSURE)", and press it.

5 Rotate the **MENU/VOL.** Wheel to select "MANUAL", and press it.
- The exposure control indicator appears.

6 To brighten the image, rotate the **MENU/VOL.** Wheel towards "+". To darken the image, rotate the **MENU/VOL.** Wheel towards "–". (maximum ±6)
- +3 exposure has the same effect as the backlight compensation. (☞ pg. 23)
- –3 exposure has the same effect as when "" is set to "SPOTLIGHT". (☞ pg. 20)

7 Press the **MENU/VOL.** Wheel in. Exposure adjustment is complete.

To return to automatic exposure control
Select "AUTO" in step **5**. Or, set the Power Switch to "A".

NOTES:
- You cannot use the manual exposure control at the same time when "" is set to "SPOTLIGHT" or "SNOW" (☞ pg. 19), or with the backlight compensation. (☞ pg. 23)
- If the adjustment does not cause any visible change in brightness, set "GAIN UP" to "AUTO". (☞ pg. 14, 15)

Iris Lock

Like the pupil of the human eye, the iris contracts in well-lit environments to keep too much light from entering, and dilates in dim environments to allow in more light. Use this function in the following situations:
- When shooting a moving subject.
- When the distance to the subject changes (so its size in the LCD monitor or the viewfinder changes), such as when the subject is backing away.
- When shooting on a reflective natural background such as at the beach or when skiing.
- When shooting objects under a spotlight.
- When zooming.

When the subject is close, keep the iris locked. Even when the subject moves away from you, the image will not darken or brighten.

Before doing the following, perform steps 1 – 5 in "Exposure Control".

6 Adjust zoom so that the subject fills the LCD monitor or the viewfinder, then press and hold the **MENU/VOL.** Wheel for over 2 seconds. The exposure control indicator and the "L" indication appear.

7 Press the **MENU/VOL.** Wheel in. The "L" indication changes to "L" and the iris is locked.

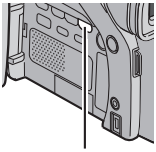
Iris Lock Indicator

To return to automatic iris control
Rotate the **MENU/VOL.** Wheel to select "AUTO", then press it in step **5**. Or, set the Power Switch to "A".
- The exposure control indicator and "L" disappear.

To lock the exposure control and the iris
After step **5** of "Exposure Control", adjust the exposure by rotating the **MENU/VOL.** Wheel. Then lock the iris in steps **6** and **7** of "Iris Lock". For automatic locking, rotate the **MENU/VOL.** Wheel to select "AUTO", then press it in step **5**. The exposure control and the iris become automatic.

Backlight Compensation

Backlight compensation brightens the subject quickly. Press **BACKLIGHT**. The indicator is displayed and the subject is brightened. If pressed again, disappears and the brightness returns to the previous level.



- Using the **BACKLIGHT** Button may cause the light around the subject to become too bright and the subject to become white.
- Backlight compensations is also available when the Power Switch is set to "A".

White Balance Adjustment

The white balance that refers to the correctness of colour reproduction under various lighting. If the white balance is correct, all other colours will be accurately reproduced. The white balance is usually adjusted automatically. However, more advanced camcorder operators control this function manually to achieve a more professional colour/tint reproduction.

To change the setting

Set "" to the desired mode. (☞ pg. 14)

- The selected mode indicator except "AUTO" appears.

[AUTO]: White balance is adjusted automatically.

MWB: Adjust the white balance manually when shooting under various types of lighting. (☞ "Manual White Balance Adjustment")

FINE: Outdoors on a sunny day.

CLOUD: Outdoors on a cloudy day.

HALOGEN: A video light or similar type of lighting is used.

[ ] = Factory-preset

To return to automatic white balance

Set "" to "AUTO". (☞ pg. 14)

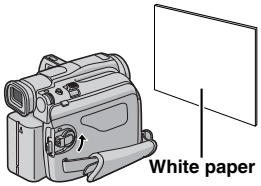
Or, set the Power Switch to "A".

NOTE:

White balance cannot be used when "" is set to "SEPIA" or "MONOTONE". (☞ pg. 20)

Manual White Balance Adjustment

Adjust the white balance manually when shooting under various types of lighting.



1 Set the Power Switch to "M" while pressing down the Lock Button located on the switch.

2 Open the LCD monitor fully. (☞ pg. 10)

3 Set "" to "MWB". (☞ pg. 14)

- The indication blinks slowly.

4 Hold a sheet of plain white paper in front of the subject. Adjust zoom or position yourself so that the white paper fills the screen.

5 Press the **MENU/VOL.** Wheel in until begins blinking rapidly.

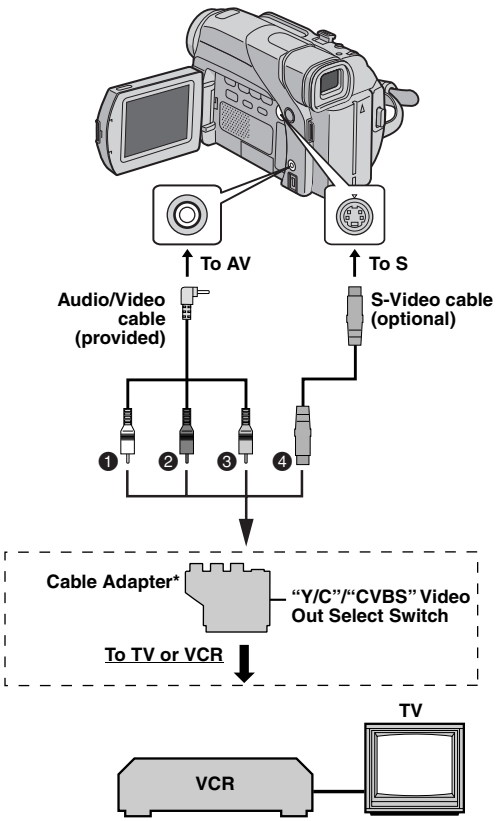
- When the setting is completed, resumes normal blinking.

6 Press the **MENU/VOL.** Wheel in twice. The Menu Screen closes and the Manual White Balance indicator is displayed.

NOTES:

- In step **4**, it may be difficult to focus on the white paper. In such a case, adjust focus manually. (☞ pg. 21)
- A subject can be shot under various types of lighting conditions indoors (natural, fluorescent, candlelight, etc.). Because the colour temperature is different depending on the light source, the subject tint will differ depending on the white balance settings. Use this function for a more natural result.
- Once you adjust white balance manually, the setting is retained even if the power is turned off or the battery removed.

Dubbing To A VCR



❶ White to AUDIO L IN
❷ Red to AUDIO R IN
❸ Yellow to VIDEO IN
❹ To S-VIDEO IN**

* If your VCR has a SCART connector, use the provided cable adapter.

** Connect when your TV/VCR has an S-VIDEO IN connector. In this case, it is not necessary to connect the yellow video cable.

NOTE:

Set the video out select switch of the cable adapter as required:

Y/C: When connecting to a TV or VCR which accepts Y/C signals and uses an S-Video cable.

CVBS: When connecting to a TV or VCR which does not accept Y/C signals and uses an audio/video cable.

To use this camcorder as a player

1 Following the illustrations, connect the camcorder and the VCR. Also refer to page 13.

2 Set the camcorder's Power Switch to "PLAY" while pressing down the Lock Button located on the switch.

3 Turn on the VCR's power.

4 Insert the source cassette in the camcorder.

5 Insert the recording cassette in the VCR.

6 Engage the VCR's AUX and Record-Pause modes.
- Refer to the instruction manual for the VCR.

7 Press ►/II on the camcorder to start playback of the source tape.

8 At the point you want to start dubbing, engage the VCR's Record mode.

9 To pause dubbing, engage the VCR's Record-Pause mode and press ►/II on the camcorder.

10 Repeat steps **7** – **9** for additional editing. Stop the VCR and camcorder.

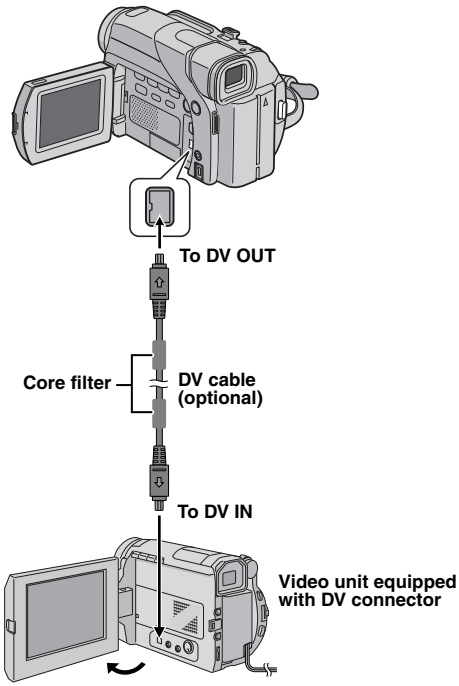
NOTES:

- **It is recommended to use the AC Adapter as the power supply instead of the battery pack. (☞ pg. 7)**
- As the camcorder starts to play your footage, it will appear on your TV. This will confirm the connections and the AUX channel for dubbing purposes.
- Before you start dubbing, make sure that the indications do not appear on the connected TV. If they do, they are being recorded onto the new tape.

  To choose whether or not the following displays appear on the connected TV
  - Date/time
    Set "DATE/TIME" to "AUTO", "ON" or "OFF". (☞ pg. 14, 17)
  - Time code
    Set "TIME CODE" to "OFF" or "ON". (☞ pg. 14, 17)
  - Indications other than date/time and time code
    Set "ON SCREEN" to "OFF", "LCD" or "LCD/TV". (☞ pg. 14, 17)

Dubbing To A Video Unit Equipped With A DV Connector (Digital Dubbing)

It is also possible to copy recorded scenes from the camcorder onto another video unit equipped with a DV connector. Since a digital signal is sent, there is little if any image or sound deterioration.



To use this camcorder as a player

1 Make sure all units are turned off.

2 Connect this camcorder to a video unit equipped with a DV input connector using a DV cable as shown in the illustration.

3 Set this camcorder's Power Switch to "PLAY" while pressing down the Lock Button located on the switch.

4 Turn on the video unit's power.

5 Insert the source cassette in this camcorder.

6 Insert the recording cassette in the video unit.

7 Press ►/II on this camcorder to start playback of the source cassette.

8 At the point you want to start dubbing, engage the video unit's Record mode.

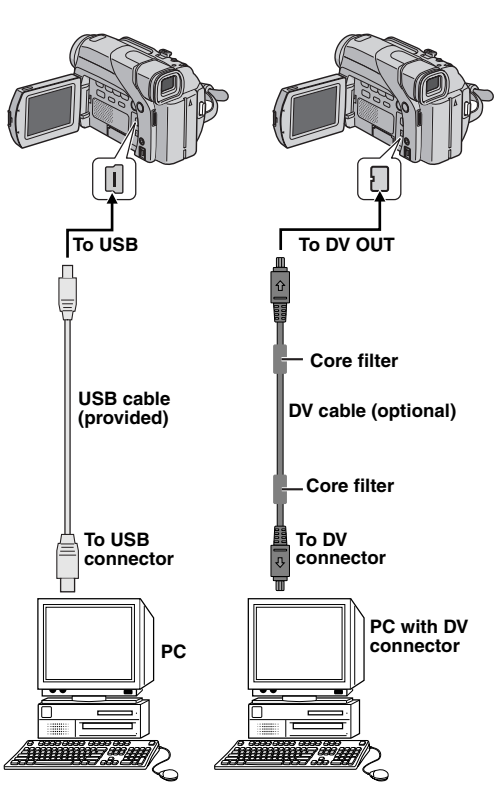
9 To pause dubbing, engage the video unit's Record-Pause mode and press ►/II on this camcorder.

10 Repeat steps ***7*** – ***9*** for additional editing. Stop the video unit and camcorder.

NOTES:

- **It is recommended to use the AC Adapter as the power supply instead of the battery pack. (☞ pg. 7)**
- If a blank portion or disturbed image is played back on the player during dubbing, the dubbing may stop so that an unusual image is not dubbed.
- Even though the DV cable is connected correctly, sometimes the image may not appear in step **8**. If this occurs, turn off the power and make connections again.
- If **SNAPSHOT** is pressed during playback, only the original playback image recorded on the tape is output from the DV connector.
- **When using a DV cable, be sure to use the optional JVC VC-VDV204U DV cable.**

Connection To A Personal Computer



[A] Using USB cable

It is possible to do the following things:

- Transfer still/moving images recorded on a tape to a PC.
- Capture still/moving images in real-time.
- Use this camcorder as a WebCam.

[B] Using DV cable

It is also possible to transfer still/moving images to a PC with a DV connector by using the provided software, software equipped with the PC or commercially available software.

NOTES:

- Refer to “SOFTWARE INSTALLATION AND USB CONNECTION GUIDE” for the installation of the bundled software and drivers.
- The software operation manual is provided as PDF file on the CD-ROM.
- **It is recommended to use the AC Adapter as the power supply instead of the battery pack. (☞ pg. 7)**
- **Never connect the USB cable and the DV cable simultaneously to the camcorder. Connect only the cable you wish to use to the camcorder.**
- **When using a DV cable, be sure to use the optional JVC VC-VDV206U or VC-VDV204U DV cable depending on the type of DV connector (4 or 6 pins) on the PC.**
- If the PC connected to the camcorder via the USB cable is not powered, the camcorder does not enter the USB mode.
- The date/time information cannot be captured into the PC.
- Refer to the instruction manuals of the PC and Software.
- The system may not work properly depending on the PC or capture board you are using.

“USB MODE” and/or “ACCESSING FILES” appears on the LCD monitor while the PC is accessing data in the camcorder or the camcorder is transferring a file to the PC.
NEVER disconnect the USB cable while “ACCESSING FILES” is displayed on the LCD monitor since this can result in product damage.

Power (pg. 6)

- Perform charging where the temperature is between 10°C and 35°C. 20°C to 25°C is the ideal temperature range for charging. If the environment is too cold, charging may be incomplete.
- Charging time is based on room temperature of 20°C.
- Charging times are for a fully discharged battery pack.
- Charging time varies according to the ambient temperature and the status of the battery pack.
- To avoid interference with reception, do not use the AC Adapter near a radio.
- Since the AC Adapter processes electricity internally, it becomes warm during use. Be sure to use it only in well-ventilated areas.
- The following operation stops charging:
  - Set the Power Switch to "PLAY", "A" or "M".
  - Disconnect the AC Adapter from the camcorder.
  - Unplug the AC Adapter from the AC outlet.
  - Detach the battery from the camcorder.
- Using the optional AA-V40 AC Power Adapter/Charger, you can charge the BN-V408U/V416U/V428U battery pack without the camcorder. However, it cannot be used as an AC Adapter.

Loading/Unloading A Cassette (pg. 9)

- It takes a few seconds for the cassette holder to open. Do not apply force.
- If you wait a few seconds and the cassette holder does not open, close the cassette holder cover and try again. If the cassette holder still does not open, turn the camcorder off then on again.
- If the tape does not load properly, open the cassette holder cover fully and remove the cassette. A few minutes later, insert it again.
- When the camcorder is suddenly moved from a cold place to a warm environment, wait a short time before opening the cassette holder cover.
- Closing the cassette holder cover before the cassette holder recedes may cause damage to the camcorder.
- Even when the camcorder is switched off, a cassette can be loaded or unloaded. After the cassette holder is closed with the camcorder switched off, however, it may not recede. It is recommended to turn the power on before loading or unloading.
- When resuming recording, once you open the cassette holder cover a blank portion will be recorded on the tape or a previously recorded scene will be erased (recorded over) regardless of whether the cassette holder came out or not. See "Recording From The Middle Of A Tape" (☞ pg. 11).

VIDEO RECORDING (pg. 10)

- When you use the LCD monitor outdoors in direct sunlight, the LCD monitor may be difficult to see. If this happens, use the viewfinder instead.
- The cassette holder cannot be opened unless a power supply is attached.
- There may be a delay after you open the cassette holder cover until the cassette holder opens. Do not use force.
- Once the cassette holder is closed, it recedes automatically. Wait until it recedes completely before closing the cassette holder cover.
- When the Recording Start/Stop button is pressed, it may take a few seconds before actual recording starts. The "●" indicator starts rotating when the camcorder actually starts recording.
- The time required to calculate and display the remaining tape length, and the accuracy of the calculation, may vary according to the type of tape used.
- "TAPE END" appears when the tape reaches its end, and the power goes off automatically if left in this condition for 5 minutes. "TAPE END" also appears when a cassette at its end is loaded.

VIDEO PLAYBACK (pg. 12)

- Clean the video heads using an optional dry cleaning cassette when:
  - No picture during playback.
  - Blocks of noise appear during playback.

  For details, ☞ pg. 33.
- If Stop mode continues for 5 minutes when power is supplied from a battery, the camcorder shuts off automatically. To turn on again, set the Power Switch to "OFF", then to "PLAY".
- You can also view the playback picture on the LCD monitor with it flipped over and pushed against the camcorder body.
- LCD monitor/viewfinder indications:
  - When power is supplied from a battery: the "▭" battery indicator is displayed. (☞ pg. 31)
  - When power is supplied from an AC outlet: the "▭" battery indicator does not appear.
- When a cable is connected to the AV connector, the sound is not heard from the speaker.

If the problem still exists after following the steps below, please consult your nearest JVC dealer.

The camcorder is a microcomputer-controlled device. External noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such cases, first disconnect its power supply unit (battery pack, AC Adapter, etc.) and wait a few minutes; and then re-connect it and proceed as usual from the beginning.

Power

No power is supplied.

- The power is not connected properly.
➜Connect the AC Adapter securely. (☞ pg. 7)
- The battery is dead.
➜Replace the dead battery with a fully charged one. (☞ pg. 6, 7)
- The LCD monitor is not open fully or the viewfinder is not pulled out when recording.
➜Open the LCD monitor fully or pull out the viewfinder.

The POWER/CHARGE lamp blinks in the Record-Standby mode.

- If the Record-Standby mode continues for 5 minutes, the camcorder's power shuts off automatically.
Then, the **POWER/CHARGE** lamp will blink to indicate for charging if the battery pack is attached to the camcorder and its power is supplied from the AC Adapter.
➜Push back and pull out the viewfinder again or close and re-open the LCD monitor to return to the Record-Standby mode.

Video Recording

Recording cannot be performed.

- The Power Switch is set to "PLAY" or "OFF".
➜Set the Power Switch to "A" or "M". (☞ pg. 10)
- The tape's erase protection tab is set to "SAVE".
➜Set the tape's erase protection tab to "REC". (☞ pg. 9)
- "TAPE END" appears.
➜Replace with new cassette. (☞ pg. 9)
- The cassette holder cover is open.
➜Close the cassette holder cover.

When shooting a subject illuminated by bright light, vertical lines appear.

- This is a result of exceedingly high contrast, and is not a malfunction.

When the screen is under direct sunlight during shooting, the screen becomes red or black for an instant.

- This is not a malfunction.

During recording, the date/ time does not appear.

- "DATE/TIME" is set to "OFF".
➜Set "DATE/TIME" to "ON". (☞ pg. 14, 16)

During recording, sound cannot be heard.

- This is normal.

The LCD monitor or viewfinder indications blink.

- Certain Wipe/Fader effects, certain modes of Program AE with special effects, "DIS" and other functions that cannot be used together are selected at the same time.
➜Re-read the sections covering Wipe/Fader effects, Program AE with special effects and "DIS". (☞ pg. 14 – 20)

Digital Zoom does not work.

- 16X optical zoom is selected.
➜Set "ZOOM" to "40X" or "700X". (☞ pg. 15).

Coloured bright spots appear all over the LCD monitor.

- White spots or bright spots of light (red, green or blue) may appear on the LCD monitor. This may occur when the Night-Scope function is activated during recording and is not a malfunction.

Video Playback

Play, Rewind and Fast-Forward functions do not work.

- The Power Switch is set to "A" or "M".
➜Set the Power Switch to "PLAY". (☞ pg. 12)

The tape is moving, but there is no picture.

- Your TV has AV input terminals, but is not set to its VIDEO mode.
➜Set the TV to the mode or channel appropriate for video playback. (☞ pg. 13)
- The cassette holder cover is open.
➜Close the cassette holder cover. (☞ pg. 9)

Blocks of noise appear during playback, or there is no playback picture and the screen becomes blue.

➜Clean the video heads with an optional cleaning cassette. (☞ pg. 33)

Advanced features

The focus does not adjust automatically.

- Focus is set to the Manual mode.

➜Set Focus to the Auto mode. (☞ pg. 21)

- The lens is dirty or covered with condensation.

➜Clean the lens and check the focus again. (☞ pg. 34)

- The recording was done in a dark place, or the contrast was low.

Snapshot mode cannot be used.

- The Squeeze mode (SQUEEZE) is selected.

➜Disengage the Squeeze (SQUEEZE) mode. (☞ pg. 14, 15)

The colour of Snapshot looks strange.

- The light source or the subject does not include white. Or there are various different light sources behind the subject.

➜Find a white subject and compose your shot so that it also appears in the frame. (☞ pg. 20)

- The Sepia (SEPIA) or Monotone (MONOTONE) mode is activated.

➜Disengage the Sepia (SEPIA) and Monotone (MONOTONE). (☞ pg. 14, 20)

The image taken using Snapshot is too dark.

- Shooting was performed under backlit conditions.

➜Press **BACKLIGHT**. (☞ pg. 23)

The image taken using Snapshot is too bright.

- The subject is too bright.

➜Set "SCENE" to "SPOTLIGHT". (☞ pg. 20)

White Balance cannot be activated.

- The Sepia (SEPIA) or Monotone (MONOTONE) mode is activated.

➜Disengage the Sepia (SEPIA) or Monotone (MONOTONE) mode before setting White Balance. (☞ pg. 20)

Wipe/Fader effects do not work.

- The Power Switch is set to "A".

➜Set the Power Switch to "M". (☞ pg. 8)

The Black & White Fader does not work.

- The Sepia (SEPIA) or Monotone (MONOTONE) mode is activated.

➜Disengage the Sepia (SEPIA) and Monotone (MONOTONE). (☞ pg. 14, 20)

Program AE with special effects does not work.

- The Power Switch is set to "A".

➜Set the Power Switch to "M". (☞ pg. 8)

The image looks like the shutter speed is too slow.

- When shooting in the dark, the unit becomes highly sensitive to light when "GAIN UP" is set to "AUTO".

➜If you want the lighting to look more natural, set "GAIN UP" to "AGC" or "OFF". (☞ pg. 14, 15)

Other problems

The POWER/CHARGE lamp on the camcorder does not light.

- The temperature of the battery is extremely high/low.
- Charging is difficult in places subject to extremely high/low temperatures.

➜To protect the battery, it is recommended to charge it in places with a temperature of 10°C to 35°C. (☞ pg. 32)

"SET DATE/TIME!" appears.

- The date/time is not set.

➜Set the date/time. (☞ pg. 8)

- The built-in clock battery has run out and the previously set date/time has been erased.

➜Consult your nearest JVC dealer for replacement.

There is no picture.

- The camcorder is not getting power, or some other malfunction exists.

➜Turn the camcorder's power off and on again. (☞ pg. 8)

Some functions are not available using the M MENU/VOL. Wheel.

- The Power Switch is set to "A".

➜Set the Power Switch to "M". (☞ pg. 8)

When the image is printed from the printer, a black bar appears at the bottom of the screen.

- This is not a malfunction.

➜By recording with "DIS" activated (☞ pg. 14, 15) this can be avoided.

When the camcorder is connected via the DV connector, the camcorder does not operate.

- The DV cable was plugged/unplugged with power turned on.

➜Turn the camcorder's power off and on again, then operate it.

The rear of the LCD monitor is hot.

- The light used to illuminate the LCD monitor causes it to become hot.

➜Close the LCD monitor to turn it off or set the Power Switch to "OFF", and let the unit cool down.

Images on the LCD monitor appear dark or whitish.

- In places subject to low temperature, images become dark due to the characteristics of the LCD monitor. When this happens, the displayed colours differ from those that are actually recorded. This is not a defect of the camcorder.

➜Adjust the brightness and angle of the LCD monitor. (☞ pg. 9, 10)

- When the LCD monitor's fluorescent light reaches the end of its service life, images on the LCD monitor become dark.

➜Consult your nearest JVC dealer.

Coloured bright spots appear all over the LCD monitor or the viewfinder.

- The LCD monitor and the viewfinder are made with high-precision technology. However, black spots or bright spots of light (red, green or blue) may appear constantly on the LCD monitor or the viewfinder during recording or playback. These spots are not recorded on the tape. This is not due to any defect of the unit. (Effective dots: more than 99.99 %)

The indicators and the image colour on the LCD monitor are not clear.

- This may occur when the surface or the edge of the LCD monitor is pressed.

The cassette will not load properly.

- The battery's charge is low.

➜Install a fully charged battery. (☞ pg. 6, 7)

Picture does not appear on the LCD monitor.

- The viewfinder is pulled out and "PRIORITY" is set to "FINDER".

➜Push the viewfinder back in or set "PRIORITY" to "LCD". (☞ pg. 10, 14, 16)

- The LCD monitor's brightness setting is too dark.

➜Adjust the brightness of the LCD monitor. (☞ pg. 9)

➜If the monitor is tilted upward 180 degrees, open the monitor fully. (☞ pg. 10)

Images on the LCD monitor are jittery.

- The speaker volume is too great.

➜Turn the speaker volume down. (☞ pg. 12)

The LCD monitor, the viewfinder and the lens have become dirty (ex. fingerprints).

➜Wipe them gently with soft cloth. Wiping strongly can cause damage. (☞ pg. 34) To clean the viewfinder, please consult your nearest JVC dealer.

Time code does not appear.

- "TIME CODE" is set to "OFF".

➜Set "TIME CODE" to "ON". (☞ pg. 14, 16, 17)

An error indication (E01, E02 or E06) appears.

- A malfunction of some kind has occurred. In this case the camcorder's functions become unusable.

➜☞ pg. 31.

An error indication (E03 or E04) appears.

- A malfunction of some kind has occurred. In this case the camcorder's functions become unusable.

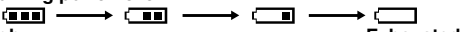
➜☞ pg. 31.

Warning Indications

🔋

Displays the battery remaining power.

Remaining power level



High **Exhausted**

As the battery power comes close to nil, the battery indicator blinks.

When the battery power is exhausted, power turns off automatically.

📼

Appears when no tape is loaded. (☞ pg. 9)

CHECK TAPE'S ERASE PROTECTION TAB

Appears when the erase protection tab is set to "SAVE" while the Power Switch is set to "A" or "M". (☞ pg. 8)

⊗ USE CLEANING CASSETTE

Appears if dirt is detected on the heads during recording. Use an optional cleaning cassette. (☞ pg. 33)

CONDENSATION, OPERATION PAUSED

PLEASE WAIT

Appears if condensation occurs. (The two indications above swiches alternately every 3 seconds.) When this indication is displayed, wait more than 1 hour until condensation disappears.

TAPE!

Appears if a tape is not loaded when the Recording Start/Stop Button or **SNAPSHOT** Button is pressed while the Power Switch is set to "A" or "M".

TAPE END

Appears when the tape ends during recording or playback. (☞ pg. 27)

SET DATE/TIME!

- Appears when the date/time is not set. (☞ pg. 8)
- Appears when the built-in clock (lithium) battery is discharged and the previously set date/time is erased. (☞ pg. 8)

LENS CAP

Appears for 5 seconds after power is turned on if the lens cap is attached.

COPYING FAILED

- Appears if dubbing of copyguarded signals is attempted while this camcorder is being used as a recorder.

E01, E02 or E06 UNIT IN SAFEGUARD MODE REMOVE AND REATTACH BATTERY

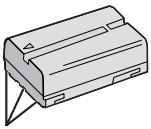
The error indications (E01, E02 or E06) show what type of malfunction has occurred. When an error indication appears, the camcorder turns off automatically. Remove the power supply (battery, etc.) and wait a few minutes for the indication to clear. When it does, you can resume using the camcorder. If the indication remains, consult your nearest JVC dealer.

E03 or E04 UNIT IN SAFEGUARD MODE EJECT AND REINSERT TAPE

The error indications (E03 or E04) show what type of malfunction has occurred. When an error indication appears, the camcorder turns off automatically. Eject the cassette once and re-insert it, then check if the indication clears. When it does, you can resume using the camcorder. If the indication remains, consult your nearest JVC dealer.

Battery Packs

The supplied battery pack is a lithium-ion battery. Before using the supplied battery pack or an optional battery pack, be sure to read the following cautions:



Terminals

- **To avoid hazards…**
  - …**do not** burn.
  - …**do not** short-circuit the terminals. When transporting, make sure the provided battery cap is attached to the battery. If the battery cap is misplaced, carry the battery in a plastic bag.
  - …**do not** modify or disassemble.
  - …**do not** expose the battery to temperatures exceeding 60°C, as this may cause the battery to overheat, explode or catch fire.
  - …use only specified chargers.
- **To prevent damage and prolong service life…**
  - …do not subject to unnecessary shock.
  - …charge in an environment where temperatures are within the tolerances shown in the chart below. This is a chemical reaction type battery — cooler temperatures impede chemical reaction, while warmer temperatures can prevent complete charging.
  - …store in a cool, dry place. Extended exposure to high temperatures will increase natural discharge and shorten service life.
  - …fully charge and then fully discharge the battery every 6 months when storing the battery pack over a long period time.
  - …remove from charger or powered unit when not in use, as some machines use current even when switched off.

NOTES:

- It is normal for the battery pack to be warm after charging, or after use.
  Temperature Range Specifications
  Charging: 10°C to 35°C
  Operation: 0°C to 40°C
  Storage: –20°C to 50°C
- The lower the temperature, the longer recharging takes.

Cassettes

To properly use and store your cassettes, be sure to read the following cautions:

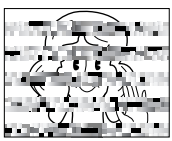
- **During use…**
  - …make sure the cassette bears the Mini DV mark.
  - …be aware that recording onto prerecorded tapes automatically erases the previously recorded video and audio signals.
  - …make sure the cassette is positioned properly when inserting.
  - …do not load and unload the cassette repeatedly without allowing the tape to run at all. This slackens the tape and can result in damage.
  - …do not open the front tape cover. This exposes the tape to fingerprints and dust.
- **Store cassettes…**
  - …away from heaters or other heat sources.
  - …out of direct sunlight.
  - …where they won't be subject to unnecessary shock or vibration.
  - …where they won't be exposed to strong magnetic fields (such as those generated by motors, transformers or magnets).
  - …vertically, in their original cases.

LCD Monitor

- **To prevent damage to the LCD monitor, DO NOT…**
  - …push it strongly or apply any shocks.
  - …place the camcorder with the LCD monitor on the bottom.
- **To prolong service life…**
  - …avoid rubbing it with coarse cloth.
- **Be aware of the following phenomena for LCD monitor use. These are not malfunctions…**
  - …While using the camcorder, the surface around the LCD monitor and/or the back of the LCD monitor may heat up.
  - …If you leave power on for a long time, the surface around the LCD monitor becomes hot.

Main Unit

- **For safety, DO NOT…**
  - ...open the camcorder's chassis.
  - ...disassemble or modify the unit.
  - ...short-circuit the terminals of the battery pack. Keep it away from metallic objects when not in use.
  - ...allow inflammables, water or metallic objects to enter the unit.
  - ...remove the battery pack or disconnect the power supply while the power is on.
  - ...leave the battery pack attached when the camcorder is not in use.
- **Avoid using the unit…**
  - ...in places subject to excessive humidity or dust.
  - ...in places subject to soot or steam such as near a cooking stove.
  - ...in places subject to excessive shock or vibration.
  - ...near a television set.
  - ...near appliances generating strong magnetic or electric fields (speakers, broadcasting antennas, etc.).
  - ...in places subject to extremely high (over 40°C) or extremely low (under 0°C) temperatures.
- **DO NOT leave the unit…**
  - ...in places of over 50°C.
  - ...in places where humidity is extremely low (below 35%) or extremely high (above 80%).
  - ...in direct sunlight.
  - ...in a closed car in summer.
  - ...near a heater.
- **To protect the unit, DO NOT…**
  - ...allow it to become wet.
  - ...drop the unit or strike it against hard objects.
  - ...subject it to shock or excessive vibration during transportation.
  - ...keep the lens directed at extremely bright objects for long periods.
  - ...expose the lens and viewfinder's lens to direct sunlight.
  - ...carry it by holding the LCD monitor or the viewfinder.
  - ...swing it excessively when using the hand strap or the grip.
  - ...swing the soft camera case excessively when the camcorder is inside it.
- **Dirty heads can cause the following problems:**



  - ...No picture during playback.
  - ...Blocks of noise appear during playback.
  - ...During recording, the Head Clog Warning indicator "⊗" appears.
  - ...Recording cannot be performed properly.

In such cases, use an optional cleaning cassette. Insert it and play back. If the cassette is used more than once consecutively, damage to the video heads may result. After the camcorder plays back for about 20 seconds, it stops automatically. Also refer to the cleaning cassette's instructions.
If, after using the cleaning cassette, the problems still exist, consult your nearest JVC dealer.
Mechanical moving parts used to move the video heads and video tape tend to become dirty and worn out over time. In order to maintain a clear picture at all times, periodic check-ups are recommended after using the unit for about 1,000 hours. For periodic check-ups please consult your nearest JVC dealer.

How To Handle A CD-ROM

- Take care not to soil or scratch the mirror surface (opposite to the printed surface). Do not write anything or put a sticker on either the front or back surface. If the CD-ROM gets dirty, gently wipe it with a soft cloth outward from the centre hole.
- Do not use conventional disc cleaners or cleaning spray.
- Do not bend the CD-ROM or touch its mirror surface.
- Do not store your CD-ROM in a dusty, hot or humid environment. Keep it away from direct sunlight.

About moisture condensation

- You have observed that pouring a cold liquid into a glass will cause drops of water to form on the glass' outer surface. This same phenomenon occurs on the head drum of a camcorder when it is moved from a cool place to a warm place, after heating a cold room, under extremely humid conditions or in a place directly subjected to the cool air from an air conditioner.
- Moisture on the head drum can cause severe damage to the video tape, and can lead to internal damage to the camcorder itself.

Serious malfunctioning

If malfunctioning occurs, stop using the unit immediately and consult your local JVC dealer.

The camcorder is a microcomputer-controlled device. External noise and interference (from a TV, a radio, etc.) might prevent it from functioning properly. In such cases, first disconnect its power supply unit (battery pack, AC Adapter, etc.) and wait a few minutes and then re-connect it and proceed as usual from the beginning.

After Use

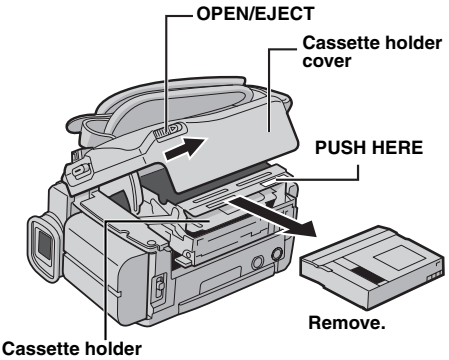
1 Turn off the camcorder.

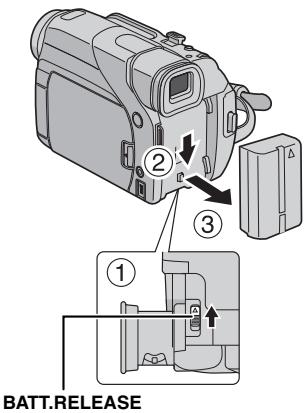
2 Slide and hold **OPEN/EJECT** in the direction of the arrow, then pull the cassette holder cover open until it locks. The cassette holder opens automatically. Remove the cassette.

3 Press "PUSH HERE" to close the cassette holder.

- Once the cassette holder is closed, it recedes automatically. Wait until it recedes completely before closing the cassette holder cover.

4 Slide **BATT.RELEASE** ① and remove the battery pack ② ③.





Cleaning The Camcorder

1 To clean the exterior, wipe gently with a soft cloth. Put the cloth in diluted mild soap and wring it well to wipe off heavy dirt. Then wipe again with a dry cloth.

2 Press the Monitor Opening Button and open the LCD monitor. Wipe gently with a soft cloth. Be careful not to damage the monitor. Close the LCD monitor.

3 To clean the lens, blow it with a blower brush, then wipe gently with lens cleaning paper.

NOTES:

- Avoid using strong cleaning agents such as benzine or alcohol.
- Cleaning should be done only after the battery pack has been removed or other power units have been disconnected.
- Mould may form if the lens is left dirty.
- When using a cleaner or chemically treated cloth refer to the cautions of each product.
- To clean the viewfinder, please consult your nearest JVC dealer.

Camcorder

For General

Power supply
DC 11.0 V (Using AC Adapter)
DC 7.2 V (Using battery pack)
Power consumption
Approx. 3.3 W (LCD monitor off, viewfinder on)
Approx. 4.6 W (LCD monitor on, viewfinder off)
Approx. 8.6 W (Maximum)
Dimensions (W x H x D)
71 mm x 91 mm x 118 mm
(with the LCD monitor closed and the viewfinder pushed back in)
Weight
Approx. 500 g
(without cassette and battery)
Approx. 590 g
(incl. cassette and battery)
Operating temperature
0°C to 40°C
Operating humidity
35% to 80%
Storage temperature
–20°C to 50°C
Pickup
1/6" CCD
Lens
F 1.6, f = 2.7 mm to 43.2 mm, 16:1 power zoom lens
Filter diameter
ø30.5 mm
LCD monitor
2.37" diagonally measured, LCD panel/TFT active matrix system
Viewfinder
Electronic viewfinder with 0.24" colour LCD
Speaker
Monaural
White LED Light
Effective distance: 1.5 m

For Digital Video Camera

Format
DV format (SD mode)
Signal format
PAL standard
Recording/Playback format
Video: Digital component recording
Audio: PCM digital recording, 32 kHz 4-channel (12-bit), 48 kHz 2-channel (16-bit)
Cassette
Mini DV cassette
Tape speed
SP: 18.8 mm/s, LP: 12.5 mm/s
Maximum recording time (using 80 min. cassette)
SP: 80 min., LP: 120 min

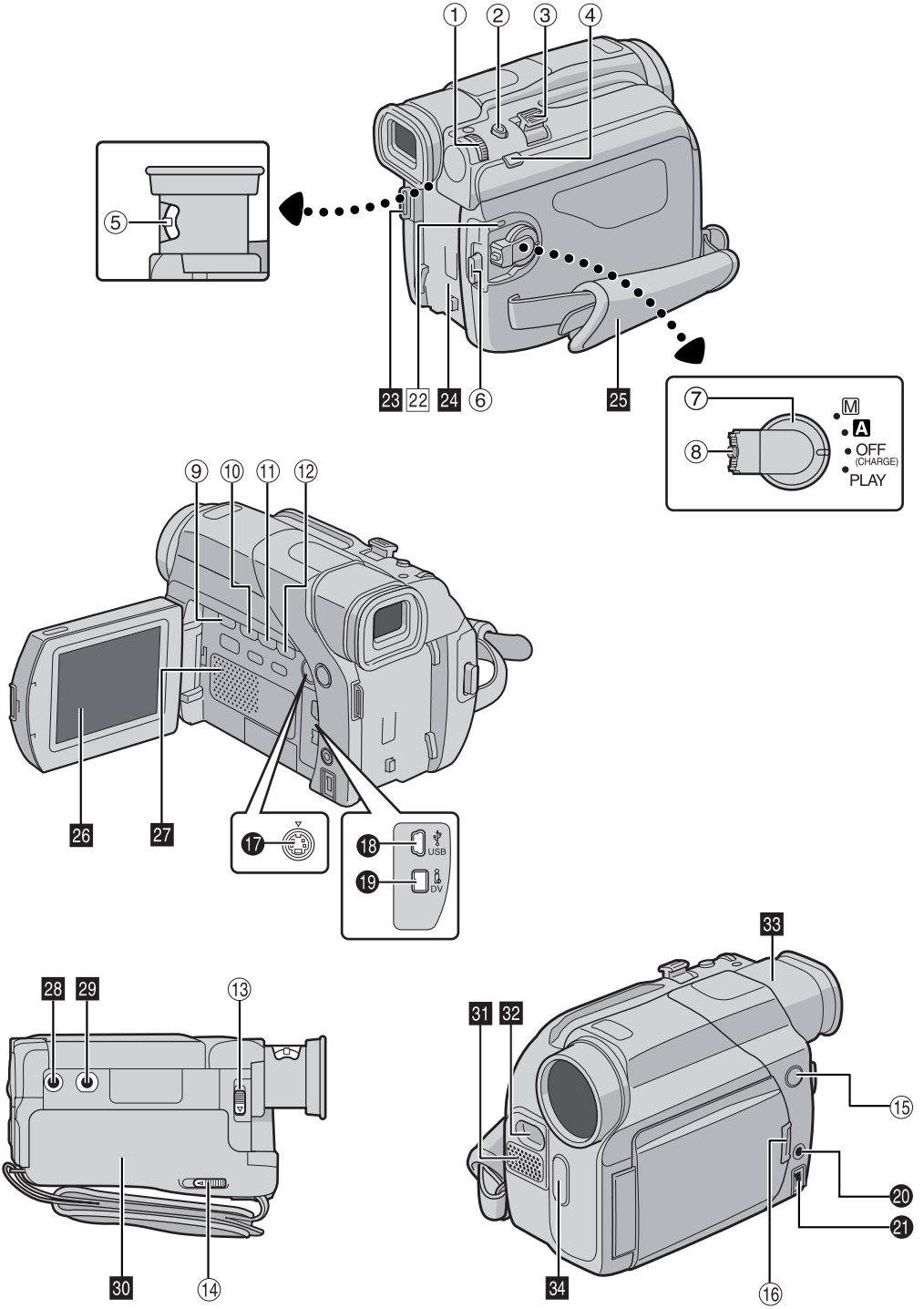
For Connectors

S
S-Video output:
Y: 1.0 V (p-p), 75 Ω, analogue
C: 0.29 V (p-p), 75 Ω, analogue
AV
Video output: 1.0 V (p-p), 75 Ω, analogue
Audio output: 300 mV (rms), 1 kΩ, analogue, stereo
DV
Output: 4-pin, IEEE 1394 compliant
USB
5-pin

AC Adapter

Power requirement
AC 110 V to 240 V~, 50 Hz/60 Hz
Output
DC 11 V ⎓, 1 A

Specifications shown are for SP mode unless otherwise indicated. E & O.E. Design and specifications subject to change without notice.


1
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23
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M
A
OFF
(CHARGE)
PLAY
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USB
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Controls

① Menu Wheel [MMENU/VOL.] (☞ pg. 14)
Speaker Volume Control [MMENU/VOL.] (☞ pg. 12)
② Snapshot Button [SNAPSHOT] (☞ pg. 20)
③ Power Zoom Lever [T/W] (☞ pg. 10)
④ Manual Focus Button [FOCUS] (☞ pg. 21)
Blank Search Button [BLANK SRCH] (☞ pg. 12)
⑤ Dioptre Adjustment Control (☞ pg. 8)
⑥ Recording Start/Stop Button (☞ pg. 10)
⑦ Power Switch [A, M, PLAY, OFF] (☞ pg. 8)
⑧ Lock Button (☞ pg. 8)
⑨ Stop Button [■] (☞ pg. 12)
⑩ Rewind Button [◀◀] (☞ pg. 12)
Night Button [NIGHT] (☞ pg. 18)
⑪ Play/Pause Button [►/II] (☞ pg. 12)
⑫ Fast-Forward Button [▶▶] (☞ pg. 12)
Backlight Compensation Button [BACKLIGHT] (☞ pg. 23)
⑬ Battery Release Switch [BATT.RELEASE] (☞ pg. 6)
⑭ Cassette Open/Eject Switch [OPEN/EJECT] (☞ pg. 9)
⑮ White LED Light Switch [LIGHT] (☞ pg. 18)
⑯ Monitor Opening Button (☞ pg. 10)
For models without button, simply pull on bottom end of LCD monitor to open.

Connectors

⑰ S-Video Output Connector [S-VIDEO] (☞ pg. 13, 24)
⑱ USB (Universal Serial Bus) Connector (☞ pg. 26)
⑲ Digital Video Connector [DV] (i.Link*) (☞ pg. 25, 26)
⑳ Audio/Video Output Connector [AV] (☞ pg. 13, 24)
㉑ DC Input Connector [DC] (☞ pg. 6, 7)

* i.Link refers to the IEEE1394-1995 industry specification and extensions thereof. The logo is used for products compliant with the i.Link standard.

Indicators

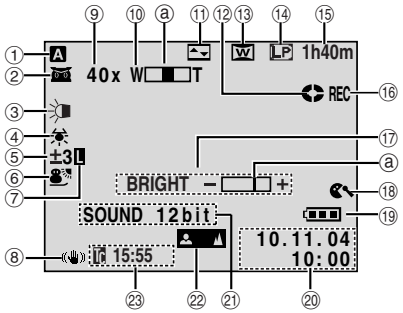
㉒ POWER/CHARGE Lamp (☞ pg. 8, 10)

Other Parts

㉓ Shoulder Strap Eyelet (☞ pg. 5)
㉔ Battery Pack Mount (☞ pg. 6)
㉕ Grip Strap (☞ pg. 7)
㉖ LCD Monitor (☞ pg. 10, 11)
㉗ Speaker (☞ pg. 12)
㉘ Stud Hole (☞ pg. 9)
㉙ Tripod Mounting Socket (☞ pg. 9)
㉚ Cassette Holder Cover (☞ pg. 9)
㉛ Stereo Microphone
㉜ White LED Light (☞ pg. 18)
㉝ Viewfinder (☞ pg. 8)
㉞ Camera Sensor
(Be careful not to cover this area, a sensor necessary for shooting is built-in here.)

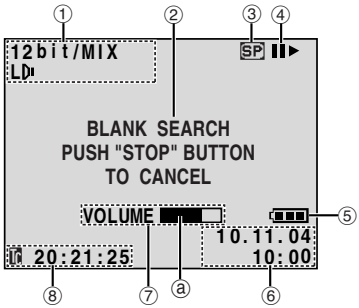
LCD Monitor/Viewfinder Indications

During Video Recording



① Operation Mode (☞ pg. 8)
② : Night-Scope Indicator (☞ pg. 18)
(Appears when Night-Scope is engaged.)
: Gain Up Mode (☞ pg. 15)
(Appears when "GAIN UP" is set to "AUTO" and the shutter speed is automatically adjusted.)
③ White LED Light Indicator (☞ pg. 18)
④ White Balance Indicator (☞ pg. 23)
⑤ : Backlight Compensation Indicator (☞ pg. 23)
±: Exposure Adjustment Indicator (☞ pg. 22)
⑥ Selected Program AE With Special Effects Indicator (☞ pg. 19)
⑦ Iris Lock Indicator (☞ pg. 22)
⑧ Digital Image Stabiliser ("DIS") (☞ pg. 15)
⑨ Approximate Zoom Ratio (☞ pg. 10)
(Appears during zooming.)
⑩ Zoom Indicator (☞ pg. 10)
(Appears during zooming.)
(The level indicator ⓐ moves.)
⑪ Selected Wipe/Fader Effect Indicator (☞ pg. 19)
⑫ Tape Running Indicator (☞ pg. 10)
(Rotates while tape is running.)
⑬ Selected Wide Mode Indicator (☞ pg. 15)
⑭ Recording Speed Mode (SP/LP) (☞ pg. 15)
⑮ Tape Remaining Time (☞ pg. 10)
⑯ REC: (Appears during recording.) (☞ pg. 10)
PAUSE: (Appears during Record-Standby mode.) (☞ pg. 10)
PHOTO: (Appears when taking Snapshot.) (☞ pg. 20)
⑰ BRIGHT: Brightness Control Indicator (LCD monitor/ Viewfinder) (☞ pg. 9)
(The level indicator ⓐ moves.)
⑱ Wind Cut Indicator (☞ pg. 15)
⑲ Battery Indicator (☞ pg. 31)
⑳ Date/Time (☞ pg. 8, 16)
㉑ Sound Mode Indicator (☞ pg. 15)
(Appears for approx. 5 seconds after turning on the camcorder.)
㉒ Manual Focus Adjustment Indicator (☞ pg. 21)
㉓ Time Code (☞ pg. 16, 17)

During Video Playback



① Sound Mode Indicator (☞ pg. 17)
② Blank Search Indicator (☞ pg. 12)
③ Tape Speed (☞ pg. 15)
④ ▶ : Playback
▶▶ : Fast-Forward/Shuttle Search
◀◀ : Rewind/Shuttle Search
❚❚ : Pause
❚❚ ▶ : Forward Frame-By-Frame Playback/Slow-Motion
◀ ❚❚ : Reverse Frame-By-Frame Playback/Slow-Motion
⑤ Battery Indicator (☞ pg. 31)
⑥ Date/Time (☞ pg. 17)
⑦ VOLUME +, – : Volume Level Indicator (Speaker) (☞ pg. 12)
(The level indicator ⓐ moves.)
BRIGHT : Brightness Control Indicator (LCD monitor/ Viewfinder) (☞ pg. 9)
(The level indicator ⓐ moves.)
⑧ Time Code (☞ pg. 16, 17)

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